Eureka-Arcata Route 101 Corridor Improvement Project

Humboldt County, California
District 1 – HUM – 101 PM 79.9 / 86.3

EA / EFIS
01-36600 / 0100000127
01-0E000 / 0113000091
01-0C970 / 0113000094
01-0C930 / 0113000078
01-0F220 / 0115000092
State Clearinghouse Number: 200109035

Final Environmental Impact Report/Statement

Volume I of IV

December 2016


Prepared by the U.S. Department of Transportation
Federal Highway Administration (FHWA) and the
State of California Department of Transportation (Caltrans)
For the Humboldt County Association of Governments (HCAOG)

General Information About This Document

This is the Final Environmental Impact Report/Study (EIR/S) for the Eureka-Arcata Route 101 Corridor Improvement Project jointly proposed by the California Department of Transportation (Caltrans) and the Federal Highway Administration (FHWA). In July 2007, a Draft Environmental Impact Report/Statement (EIR/S) for this project was approved for public circulation. Two public meetings were subsequently held to answer questions and receive comments related to the document and project. This Final EIR/S consists of four volumes, organized as follows:

Volume I is an update of the Draft EIR/S and contains the project need and purpose, description, and environmental impact discussion. It reflects design refinements to the Preferred Alternative and includes mitigation/abatement measures made in response to comments on the Draft EIR/S. The Final EIR/S also identifies Modified Alternative 3A as the Preferred Alternative.

Volume II contains the appendices of the EIR/S.

Volume III contains responses to all comments from federal, state, and local agencies and organizations that were received during the July 2007 Draft EIR/S public circulation and comment period.

Volume IV contains responses to all comments from the general public that were received during the July 2007 Draft EIR/S public circulation and comment period.

Copies of the Final EIR/S are available at the following County of Humboldt libraries:

Eureka Main Branch 1313 3rd Street Eureka, CA 95501	Arcata Branch 500 7th Street Arcata, CA 95521

To obtain a copy of this document, or supporting specialist reports, please send your requests to:

Sandra Rosas
707-441-5730
Sandra.Rosas@dot.ca.gov
California Department of Transportation
1656 Union Street
Eureka, CA 95501

This Final EIR/S can also be viewed at http://www.dot.ca.gov/dist1/d1projects/eureka_arcata/

For individuals with sensory disabilities, this document is available in Braille, large print, on audiocassette, or computer disk. To obtain a copy in one of these alternate formats, please write or call Sandra Rosas, Environmental Office Chief, California Department of Transportation, P.O. Box 3700, Eureka, CA 95502; 707-441-5730; or dial 711 to access the California Relay Service.

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Eureka-Arcata Route 101 Corridor Improvement Project
In Humboldt County, California from Post Miles 79.9 to 86.3

Final Environmental Impact Statement / Environmental Impact Report

Submitted Pursuant to:
Division 13, California Public Resources Code
42 USC 4332(2)(C) and 49 USC 4332(2)(C)
by the U.S. Department of Transportation - Federal Highway Administration
and the State of California - Department of Transportation

12/15/16
Date of Approval

Timothy Craggs
District 1 Director
California Department of Transportation
CEQA Lead Agency

12/20/16
Date of Approval

Vincent Mammano
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Abstract

The proposed Eureka-Arcata Route 101 Corridor Improvement Project consists of various improvements on Route 101 between the Eureka Slough bridge and the 11th Street overcrossing in Arcata. Major project features may include closing roadway median crossings, constructing a roadway grade separation at Indianola Cutoff, replacing the southbound Jacoby Creek bridge, and partially or fully signalizing the Route 101/Airport Road intersection. The purpose of the project is to improve safety; reduce operational conflicts and delay; and rehabilitate roadway to meet current traffic engineering design standards as feasible. Five Build Alternatives and a No-Build Alternative are evaluated in this Final Environmental Impact Report/Statement. The proposed project could affect traffic circulation, wetlands, listed fish species, water quality, and visual resources. The project includes measures to avoid, minimize, and compensate for potential project adverse effects.

Summary

The Eureka-Arcata Route 101 Corridor Improvement project is jointly proposed by the California Department of Transportation (Caltrans) and the Federal Highway Administration (FHWA) and is subject to state and federal environmental analysis requirements. Project documentation, therefore, has been prepared in compliance with both the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA). Caltrans is the lead agency under CEQA and the FHWA is lead agency under NEPA. Some impacts determined to be significant under CEQA may not lead to a determination of significance under NEPA.

In July 2007, a Draft Environmental Impact Report/Statement (EIR/S) for this project was circulated to the public. **Any additions or modifications subsequent to the draft document are marked with a vertical line in the margins in this final document.**

This Final EIR/S consists of two volumes, organized as follows:

- **Volume I** contains the project need and purpose, description, and environmental impact discussion of the Final EIR/S. The Final EIR/S also identifies Modified Alternative 3A as the Preferred Alternative.
- **Volume II** contains the appendices of the EIR/S.
- **Volume III** contains responses to all comments from federal, state, and local agencies and organizations that were received during the July 2007 Draft EIR/S circulation and comment period.
- **Volume IV** contains responses to all comments from the general public that were received during the July 2007 Draft EIR/S circulation and comment period.

Following circulation of the Final EIR/S, if the decision is made to approve the project, a Notice of Determination would be published for compliance with the California Environmental Quality Act and a Record of Decision (ROD) published for compliance with the National Environmental Policy Act. The next step in the process would be obtaining all required public agency permits and preparation of final project design. Project construction is tentatively scheduled to start in year 2019 and completed in 2021.

The following summary identifies major items of importance to the Humboldt County Association of Governments and the California Transportation Commission regarding the funding and planning for construction of the proposed project. Detailed project information is presented in the body of this document.

Proposed Project

Caltrans and FHWA propose to make improvements to Route 101 between the Eureka Slough bridge in Eureka and the 11th Street overcrossing in Arcata, post miles (PMs) 79.9 to 86.3, in Humboldt County. See Figures S-1, 2, and 3 for Project Location Maps. The proposed project would improve safety and reduce operational conflicts and traffic delays at Route 101 intersections between Eureka and Arcata by:

- Eliminating uncontrolled Route 101 vehicle crossing movements
- Extending or constructing right-turn acceleration and deceleration lanes

Modified Alternative 3A, identified as the Preferred Alternative, also includes constructing a Route 101/Indianola Cutoff grade separation, a half signal at the Route 101/Airport Road intersection, and replacing the existing Route 101 southbound Jacoby Creek bridge. All the project Build Alternatives are described in detail in Chapter 2.

NOTE: As described in the project description in the Draft EIR/S, the proposed project includes a number of safety enhancements, traffic operations, and major maintenance components/improvements. These various project improvements were funded and planned under two separate funding programs: the State Transportation Improvement Program (STIP) and the State Highway Operation and Protection Program (SHOPP).

Since the Draft EIR/S was circulated, for funding purposes, the paving overlay portion of the project was constructed ahead of other project components.[1] Other components of the SHOPP-funded work will also be funded and constructed separately. The Final EIR/S provides environmental documentation for all STIP and SHOPP project components. The paving component of the project was reviewed and approved under a separate environmental NEPA/CEQA clearance process.

[1] The completed paving work does not reduce the project footprint (area of permanent development) since the paving was confined to overlaying the existing pavement. The proposed project still includes paving to extend acceleration and deceleration. Also depending on the alternative, additional paving would be required to construct a grade separation and modify the Route 101/Airport Road intersection.

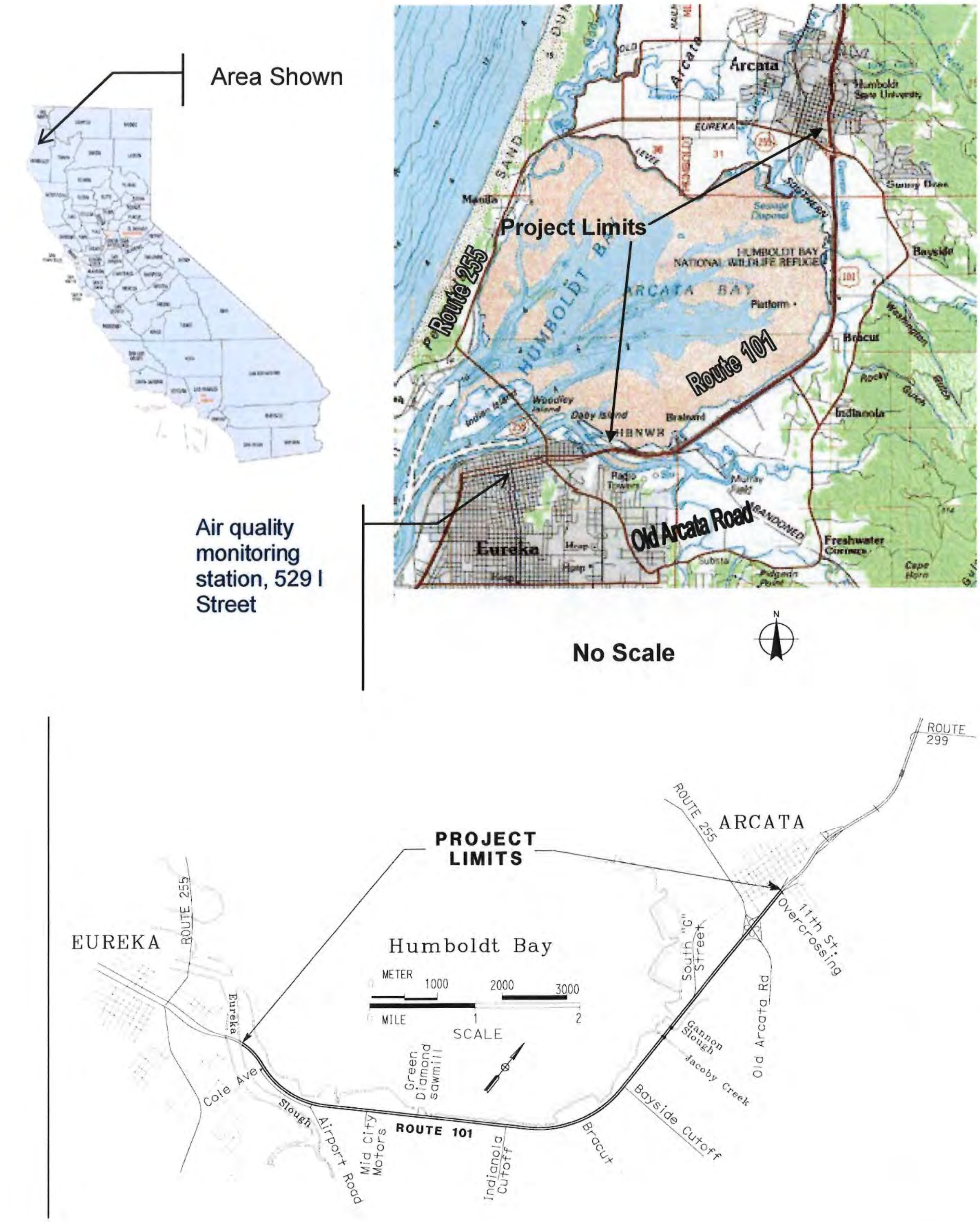

Figure S-1 Project Location Map

Figure S-2 Aerial Photograph of Project Location

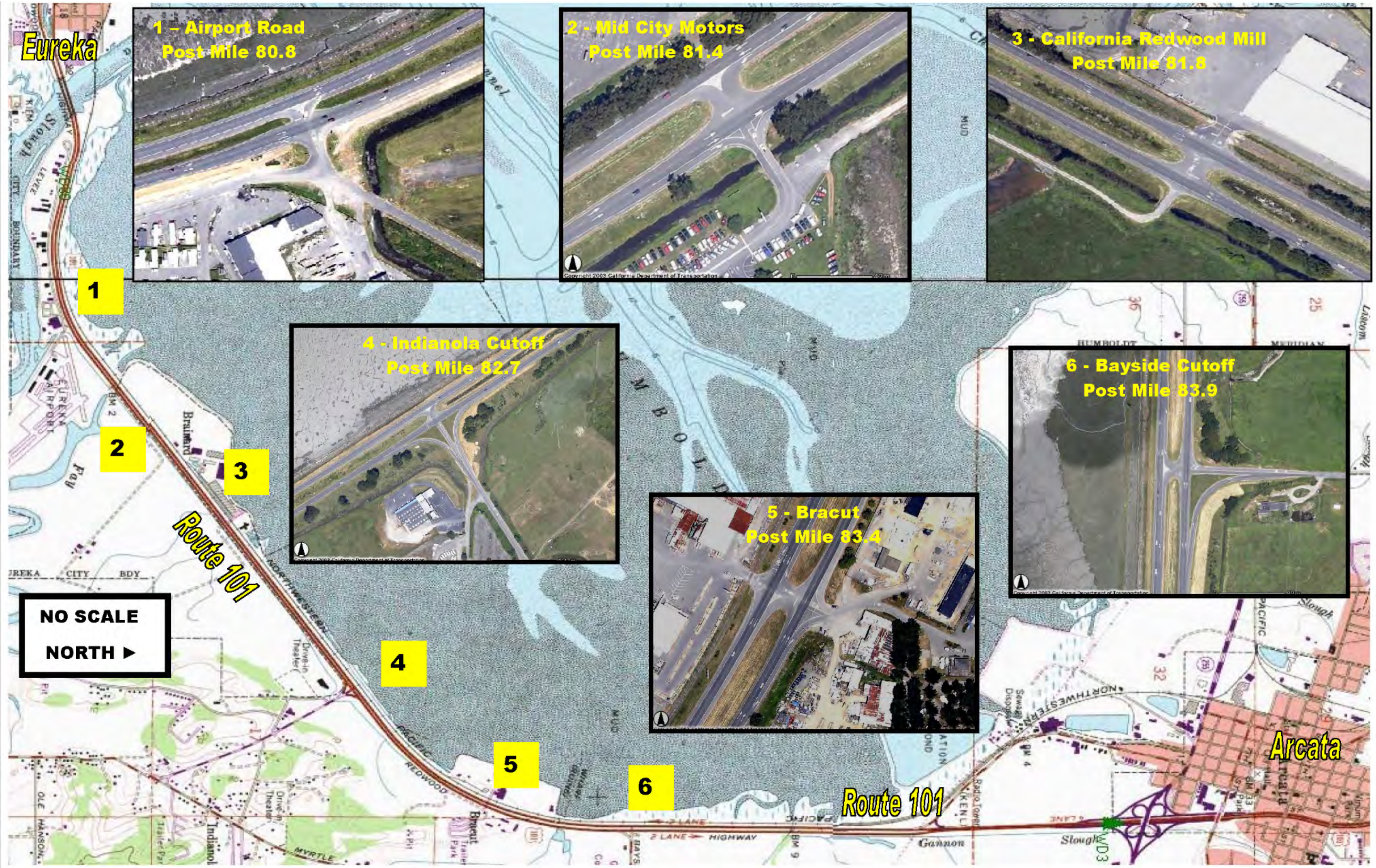

Figure S-3 Route 101 Existing Open Median Locations

Project Need and Purpose

The project is needed to address the following concerns:

- Uncontrolled vehicle crossing movements at median openings which have led to high collision rates as compared to similar facilities, and predicted future collisions at access roads within the Route 101 corridor. For example, see Figure 1-3 which shows conflicting vehicle travel paths at the existing non-signalized Route 101/Bracut intersection.

- Increased delays for vehicles lining up to cross at intersections — particularly during peak (rush hour) periods within the corridor.

- Objects within the roadway clear recovery zone[2]; existing bridge rails do not comply with current highway design standards; roadway lighting needs to be relocated/replaced to conform to current highway design standards and maintenance needs.

- The existing southbound Jacoby Creek bridge was originally constructed in 1920 and widened in 1956. Because of age, deterioration, and the need for more frequent and costly maintenance, this bridge needs to be replaced.

- There are existing tide gates on culverts that extend under the Route 101 roadway which minimize tidal waters from inundating surrounding pasturelands. These tide gates were installed in 1954 and are currently in poor condition and require repair with increasing frequency. Nine tide gates are proposed to be replaced.

The purpose of the project is to:

- Improve safety at intersections;
- Eliminate uncontrolled left turn movements and on and off traffic vehicle movements at median crossings within the Route 101 Corridor;
- Reduce delay at intersections; and
- Restore and rehabilitate the existing Route 101 roadway.

[2] Any fixed object too close to the edge of the traveled way (within 30 feet for freeways and expressways) can pose potential hazards for errant vehicles or vehicles making emergency maneuvers. Removing or shielding fixed objects that are within 30 feet from the edge of the traveled way, or clear recovery zone, would enhance safety.

PROJECT ALTERNATIVES

There are five Build Alternatives and a No-Build Alternative evaluated in this document. Since the Draft Environmental Document (DED), two additional alternatives were evaluated. These alternatives are slight modifications of Alternatives 1 and 3, referred to as 1A and Modified 3A respectively. See Figure S-4 for an overview of the Build Alternatives and Appendix A for detailed plans of the Build Alternatives.

Alternative 1 - Restore and Rehabilitate Roadway with Median Closures

This Alternative consists of the following:

1) Close, re-grade, and re-vegetate Route 101 median crossings at the following Route 101 intersections: Airport Road, Mid-City Motor World, California Redwood Company (Simpson), Indianola Cutoff, Bracut, and Bayside Cutoff.

2) Extend right-side acceleration lanes and deceleration lanes at the following Route 101 intersections: Mid-City Motor World, California Redwood Company (Simpson), Indianola Cutoff, Bracut, and Bayside Cutoff. At the Route 101/Cole Avenue intersection, close the existing northbound access to Route 101 (right turn move) and extend the existing deceleration lane.

3) Install high tension cable barrier within the Route 101 median between the Eureka Slough bridges and Airport Road.

4) Replace the southbound Route 101 Jacoby Creek bridge. The new, 43-foot wide bridge would include bicycle railing installed on the outside barrier and would have an 8-foot wide barrier-separated travel way for bicyclists and pedestrians. The non-motorized transit travel way would provide a transition to the existing 10-foot wide outside shoulder on both sides of the proposed bridge.

5) Replace bridge rail on the Route 101 northbound Jacoby Creek and Gannon Slough bridges[3] to meet current safety standards. Bridge rail replacement would include bicycle railing installed on the outside barrier (outer edge of the bridge deck).

6) Replace nine existing tide gates adjacent to the Route 101 roadway within the project limits.

7) Add or replace roadway lighting on Route 101 at Cole Avenue, Indianola Cutoff, Bayside Cutoff, South G Street, and the Route 101/255 interchange. New electrical conduit would be installed between the lights and services.

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[3] The Draft Environmental Impact Report/Statement for this project stated that northbound Gannon Slough Bridge would be widened; the widening work has subsequently been dropped from the project scope of work.

8) If needed, to enhance travel safety, the project may include installing metal beam guardrail with standard end treatments at three billboards adjacent to the southbound Route 101 lane south of Bracut. (The existing billboards are outside the existing state highway right-of-way, but are within the 30-foot clear recovery zone. If needed, the proposed guardrail would be installed within the existing highway right-of-way.)

9) Remove approximately one tree and two groups of shrubs within the corridor that are within the 30-foot wide clear recovery zone on the east side of Route 101 and between the Jacoby Creek bridges. See Chapter 1, Section 1.2 for more information regarding the clear recovery zone.

10) Remove median barrier guardrail in the Route 101 median and install high tension cable median barrier from South G Street to the 11th Street overcrossing in Arcata.[4]

11) Remove signage within the Safety Corridor (PMs 79.9 to 84.5). After project construction, the current posted speed limit of 50 mph between the Eureka Slough bridges and Gannon Slough bridges would remain at the existing 50 mph. However, 45 days after project construction, Caltrans would conduct an Engineering and Traffic Survey to comply with the California Vehicle Code. The California Vehicle Code requires a renewed engineering and traffic survey whenever substantial changes in roadway or traffic conditions have occurred. If the prevailing 85th percentile of traffic eventually rises above 55 mph after project construction, Caltrans would be required to address the condition: raising the posted speed limit would be considered and possibly implemented. **NOTE:** North of the Gannon Slough bridges, Route 101 is a freeway with a current posted speed limit of 65 mph. The posted freeway speed limit would remain the same after construction.

Alternative 1A

Alternative 1A is similar to Alternative 1 except that three median turnarounds (U-turns) with auxiliary lanes and partial signalization at the Route 101/Airport Road intersection would be constructed. The turnarounds would require removing approximately 60 additional trees compared to Alternative 1. Left turn movements from Airport Road to southbound Route 101 would not be allowed; only left turns from southbound Route 101 to Airport Road. U-turns would minimize out-of-direction travel and traffic delay which would result from elimination of left turn movements and closing the roadway medians.

[4] The Draft Environmental Impact Report/Statement for this project stated concrete median barrier would be constructed at this location. Subsequently, concrete median barrier has been dropped from the project scope of work and changed to a high tension cable barrier.

Alternative 2 – Restore and Rehabilitate Roadway Project with Median Closures and Grade Separation at Indianola Cutoff

Alternative 2 includes all the elements of Alternative 1, and would also include constructing a compact diamond grade separation at Indianola Cutoff instead of closing the existing median at this location. Because of the proposed grade separation, Alternative 2 would require removing 41 more trees compared to Alternative 1.

Alternative 3 – Restore and Rehabilitate Roadway Project with Median Closures and Grade Separation at Indianola Cutoff and Signalized Intersection at Airport Road

Alternative 3 includes all of the elements of Alternative 2; however, work at Airport Road would require construction of a signalized intersection with Route 101.

To accommodate fully signalizing the Airport Road/Route 101 intersection, Alternative 3 would require realigning the Airport Road intersection. The close proximity of the existing Airport Road/Route 101 intersection and Airport Road/Jacobs Avenue intersection requires Airport Road to be realigned outside the existing State right-of-way, across the end of an abandoned runway at the Murray Field Airport, and across the existing ditch east of northbound Route 101 to a new intersection location on Route 101.

An additional continuous northbound lane would be constructed from Cole Avenue to the Mid-City Motor World entrance to minimize traffic queuing and provide adequate merging onto Route 101 which would occur because of signalizing Route 101 at Airport Road. (The additional lane would eliminate the need for extending the existing acceleration and deceleration lanes.) A retaining wall on the east side of Route 101 would be required for a portion of the distance between Cole Avenue and Airport Road to avoid placing fill material on the existing slope to minimize impacts to wetlands and existing drainage patterns. The widening for the additional lane north of the intersection with Airport Road would occur within the Route 101 median to avoid any further encroachment into the airport's flight approach and departure (air space) surface. Route 101 would continue to have two northbound through lanes north of Mid-City Motor World. Southbound Route 101 would remain unchanged, except that the left turn lane at Airport Road would be modified to conform to the realigned intersection. **NOTE:** The County of Humboldt has stated they would not allow any portion of the airport property to be converted for highway improvements.

The operation of the proposed realigned Airport Road intersection at Route 101 would allow U-turns by truck traffic and passenger vehicles from southbound Route 101 to northbound Route 101. Passenger vehicles, but not truck traffic, would be allowed to make the U-turn move from either direction at the Airport Intersection.

Because of the proposed grade separation, Alternative 3 would require removing 39 more trees than Alternative 1.

Modified Alternative 3A – Identified Preferred Alternative

This Alternative was developed after reviewing public comment on the Draft EIR/S. It is similar to Alternative 3 except that the proposed grade separation at Indianola Cutoff was redesigned with steepened fill slopes and narrower median to reduce wetland impact and cost. This Alternative also includes a half signal at Airport Road, but does not include acquiring land from the airport as in Alternative 3. Left turn movements from Airport Road to southbound Route 101 would be controlled by the proposed half signal. Modified Alternative 3A would require removing approximately 23 trees. (See Chapter 2 for a discussion of the identification of the Preferred Alternative.)

Alternative 7 – No-Build

Alternative 7 is the No-Build Alternative. This Alternative retains the current roadway alignment and access, including median openings. The No-Build Alternative would propose no modifications to the existing alignment or access for this project. The existing posted speed limit of 50 mph, flashing warning lights, daytime headlight and reduced speed signs would remain. Other projects to maintain/rehabilitate the road surfaces, drainage improvements, bridge retrofit, widening projects or other safety-related projects could be initiated on a case-by-case basis. The No-Build Alternative does not meet the need and purpose for the project.

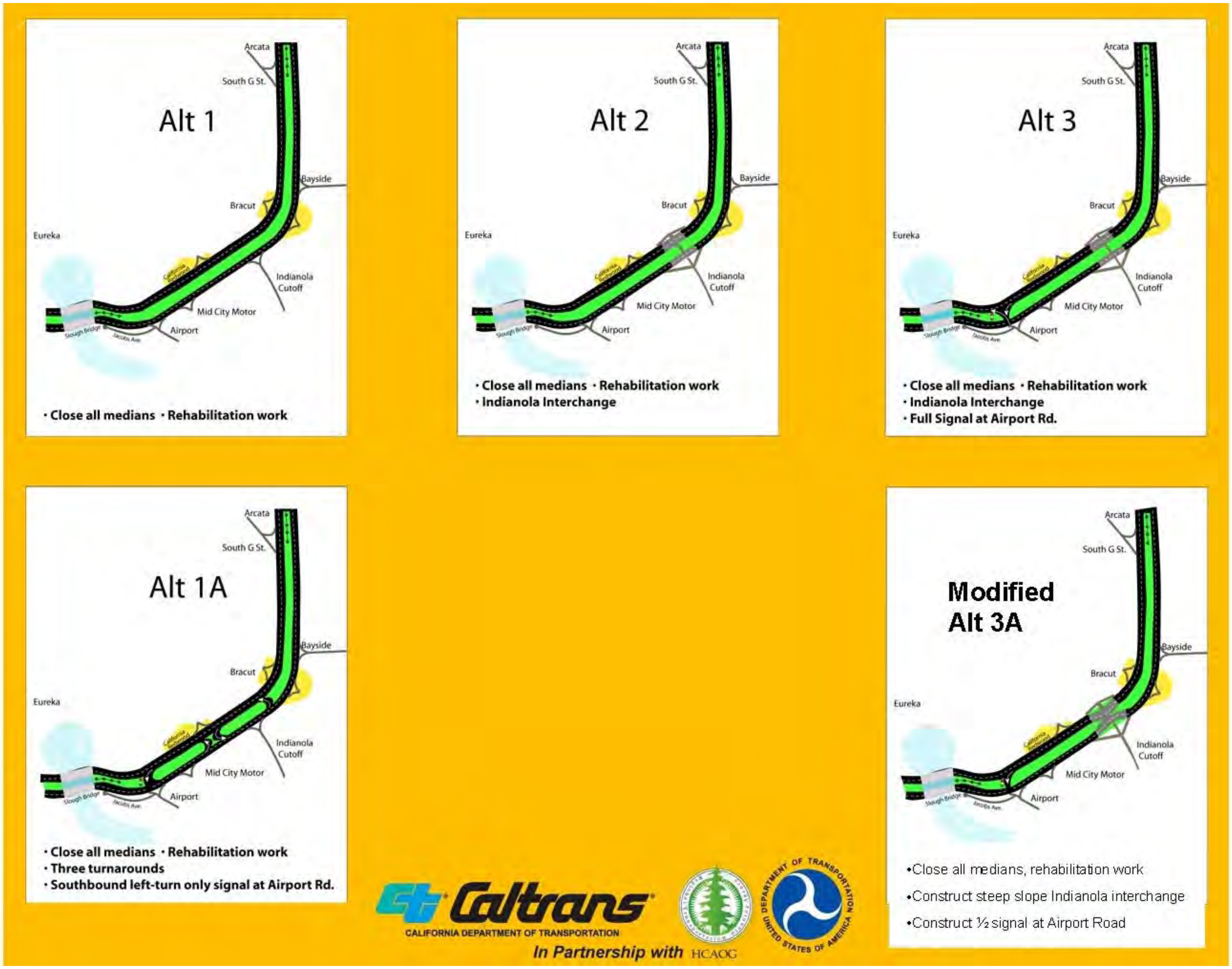


Figure S-4 Overview of Alternatives

Joint CEQA/NEPA Document

The proposed project is a joint project by the California Department of Transportation (Caltrans) and the Federal Highway Administration (FHWA) and is subject to state and federal environmental review requirements. Project documentation, therefore, has been prepared in compliance with both the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA). Caltrans is the lead agency under CEQA and FHWA is the lead agency under NEPA.

Some impacts determined to be significant under CEQA may not lead to a determination of significance under NEPA. One of the most commonly seen joint document types is an Environmental Impact Report/Environmental Impact Statement (EIR/S).

Following approval and circulation of the Final EIR/S, Caltrans and FHWA would take actions regarding the environmental document. In accordance with CEQA, Caltrans would certify that the project complies with CEQA, prepare findings for all significant impacts identified, prepare a Statement of Overriding Considerations for impacts that cannot be mitigated below a level of significance, and certify that the findings and Statement of Overriding Considerations have been considered prior to project approval. Caltrans would then file a Notice of Determination with the State Clearinghouse which would identify (1) whether the project would have significant impacts, (2) if mitigation measures were included as conditions of project approval, (3) that findings were made, and (4) that a Statement of Overriding Considerations was adopted. The FHWA would then document and explain its decision regarding the selected alternative, project impacts, and mitigation measures in a Record of Decision (ROD) in accordance with NEPA.

Summary of Major Project Effects/Impacts and Mitigation/Measures to Avoid Harm

This section lists and summarizes potential impacts of each alternative by resource area followed by a summary table. For a detailed discussion, refer to Chapter 3 of this document.

Wetland Impacts. Modified Alternative 3A, identified as the Preferred Alternative, could permanently fill 10.2 acres of wetland.[5] A conceptual mitigation plan for this project includes proposals to mitigate for both temporary and permanent wetland impacts.

[5] The area of permanent wetland impact reported here consists of both U.S. Army Corps of Engineers and California Coastal Commission wetlands. For more information, see the glossary at the end of this summary or Section 3.3.2 Wetlands in Chapter 3.

Social and Economic Impacts. Closing Route 101 median openings at local intersections would create out-of-direction travel for residents (including Environmental Justice communities) and businesses along the Route 101 corridor between Eureka and Arcata. Alternatives 1A, 2, 3, and Modified Alternative 3A all include features that would help minimize out-of-direction travel and delay created by median closures.

Aesthetic impacts. Modified Alternative 3A, identified as the Preferred Alternative, could remove up to 23 mature trees (various species) during construction. Mitigation will be replanting of trees in various locations and using visually appropriate barrier railing.

Table S-1 Summary of Potential Environmental Consequences						
Environmental Resource/Condition Compared to No-Build Alternative	**Alternative 1 Close median crossings $24 Million**	**Alternative 1A+ Close median crossings, construct two turnarounds and a half signal at Airport Road $35 Million**	**Alternative 2 Close median crossings, construct grade separation at Indianola Cutoff $60 Million**	**Alternative 3 Close median crossings, construct grade separation at Indianola Cutoff and a full signal at Airport Road $68 Million**	**MODIFIED Alternative 3A+ Close median crossings, construct steep slope grade separation at Indianola Cutoff and a half signal at Airport Road $58 Million**	**Alternative 7 No-Build Alternative**
Permanent wetland impacts (≤3-Param / USACE Jurisdictional / TOTAL)	1.3 / 2.4 / **3.7** (acres)	1.7 / 5.7 / **7.4** (acres)	2.1 / 10.4 / **12.5** (acres)	2.2 / 7.6 / **9.8** (acres)	2.0 / 8.2 / **10.2** (acres)	0
Total permanent impacts in acres to Other Waters of the U.S. (excludes wetland & habitat enhancements)**	0	0	0	0	0	0
Temporary wetland impacts (acres)	4.1	4.8	5.3	5.0	4.5	Not applicable
Listed, Threatened, Endangered Species	Minor	Minor	Minor	Minor	Minor	No Effect
Water quality during construction after Avoidance and Implementation of Measures to Minimize Harm/Mitigation	Minor	Minor	Minor	Minor	Minor	No Effect
Floodplain encroachment	Negligible	Negligible	Negligible	Negligible	Negligible	No Effect
Air quality	Minor	Minor	Minor	Minor	Minor	No Effect
Energy: Year 2041 percent changes in highway volume for each Build Alternative provide an approximate energy use comparison.	7%	0%	6%	1%	1%	N/A*
Traffic increase on local roads	Substantial	Minor	Minor	Minor	Minor	Moderate*
Pedestrian and bicycle circulation	Substantial	Substantial	Moderate	Minor	Minor	Unknown*
Route 101 Corridor business access	Substantial	Minor***	Substantial	Minor	Minor***	Moderate*
Environmental Justice communities	Substantial	Minor***	Moderate	Minor	Minor***	Moderate*
Out of direction travel / delay	Substantial	Minor	Moderate	Minor	Minor	Moderate*
Potential for growth related / indirect effects	Minor	Minor	Minor	Minor	Minor	No Effect
Noise	Minor	Minor	Minor	Minor	Minor	Unknown*
Hazardous waste	Minor	Minor	Minor	Minor	Minor	No Effect
Cultural resources	No Adverse Effect	No Adverse Effect	No Adverse Effect	No Adverse Effect	No Adverse Effect	No Effect
Trees removed, visual quality after Implementation of Measures to Minimize Harm	23 - Minor	83 - Moderate	64 - Moderate	64 - Moderate	54 - Moderate	No Effect

+ The half signal at Airport Road would provide a westbound left turn option from Airport Road to southbound Route 101. Southbound Route 101 traffic would not be controlled by the traffic signal phases.

* Even though the No-Build Alternative does not include any proposed roadway changes, traffic volumes and speeds are expected to increase in the foreseeable future, which may necessitate closing one or more Route 101 intersection median openings within the corridor. Closing one or more intersection median openings could potentially restrict access to businesses and residences; add out-of-direction travel and delay; increase fuel consumption; and, adversely affect the Level-of-Service of local streets as well as State Route 255. Bicyclists and pedestrians, as well as motorized vehicles, would be affected if this were to occur. In addition, without improvements, left-turn movements onto Route 101 are predicted to degrade to Level-of-Service F in year 2041 at the following Route 101 intersections: Airport Road, Mid-City Motor World, Indianola Cutoff, Bracut, and Bayside Cutoff.

** Although some work would occur in Section 10/Waters of the U.S., none of the Build Alternatives would result in adverse impacts requiring mitigation.

*** These environmental consequences are only projected for 15 to 20 years after project construction. After this period, as traffic volumes increase, unless there are other improvements, the consequences would likely change from minor to moderate.

Coordination with Public and Other Agencies

The Federal Highway Administration (FHWA), U.S. Army Corps of Engineers (USACE), U.S. Environmental Protection Agency (EPA), U.S. Fish and Wildlife Service (USFWS), National Oceanic and Atmospheric Administration (NOAA) Fisheries, and Caltrans have adopted an agency policy to improve interagency coordination and to integrate the National Environmental Policy Act (NEPA) and Clean Water Act Section 404 procedures. Pursuant to these procedures, the Eureka-Arcata Corridor Improvement Project requires consultation with the aforementioned agencies. See Appendix E for more information. Caltrans and FHWA have been coordinating, and will continue to coordinate, with the resource agencies through meetings and the NEPA-404 Integration process.

Issues To Be Resolved and Processes To Be Completed in Coordination With Public and Other Agencies Before Construction of the Corridor Improvement Project

- Final wetland mitigation and monitoring plan
- Tree replacement measures
- Invasive species management
- Final project design
- Utility relocation
- Trenching locations for placement of conduit for roadway lighting
- Obtain all needed resource agency permits
- Develop cultural resource monitoring plan
- Funding for a bicycle and pedestrian trail between Eureka and Arcata
- Removal of billboards
- Work with local and state California Coastal Commission staff to determine appropriate Sea Level Rise adaptation strategies

Required Approvals and Permits

The following separate regulatory approvals are required before construction can commence:

> ***Section 404 Individual Permit.*** The U.S. Army Corps of Engineers (USACE) regulates the Nation's waterways and wetlands and is responsible for implementing and enforcing Section 404 of the federal Clean Water Act (CWA). USACE regulations require that any activity that discharges material or requires excavation in waters of the United States, including wetlands, must obtain a Section 404 permit. An Individual Section 404 permit is required for activities with more substantial wetland impact potential. Implementation of the Corridor Improvement Project would result in the filling of wetlands and other waters of the United States. **Status:** Submitted a preliminary permit application as part of the NEPA/404 integration process. See Appendix E for more information.

Section 10 of the Rivers and Harbors Act Permit. This project would require a Section 10 permit from the USACE for the construction of any structure in or over any navigable water of the United States, the excavating from or depositing of material in such waters, or the accomplishment of any other work affecting the course, location, condition, or capacity of such waters. **Status:** Coordination with USACE staff is ongoing. Permit application to be submitted following final environmental document approval, but prior to construction.

Section 401 Water Quality Certification. The State Water Resources Control Board (SWRCB) and the Regional Water Quality Control Boards (RWQCBs) promulgate and enforce narrative and numeric water quality standards in order to protect water quality and adopt and approve Water Quality Control Plans. The SWRCB and the RWQCBs also regulate discharges of harmful substances to surface waters, including wetlands, under the federal CWA and the California Porter-Cologne Water Quality Control Act (Porter-Cologne). If issuance of a Section 404 permit is required, it would be subject to water quality certification under CWA Section 401. **Status:** Coordination with RWQCB staff is ongoing. Permit application to be submitted following final environmental document approval, and prior to construction.

Federal Endangered Species Act (FESA). The primary federal law protecting threatened and endangered species is the Federal Endangered Species Act (FESA). **Status:** A Biological Opinion (BO) was issued on November 22, 2010 from the USFWS, which included measures to avoid and minimize harm to the tidewater goby during construction. The BO concludes that the proposed project is not likely to jeopardize the continued existence of the goby and is not likely to destroy or adversely modify critical habitat.

NOAA Fisheries issued a Letter of Concurrence on April 29, 2016 which concluded the Federal Endangered Species Act consultation process. NOAA Fisheries concluded the proposed project may affect, but is not likely to adversely affect, federally listed Southern Oregon/Northern California Coast (SONCC) coho salmon, California Coastal Chinook salmon, Northern California steelhead, Southern Distinct Population Segment of North American green sturgeon, or their designated critical habitats.

The USFWS BO and NOAA Fisheries Informal Consultation letter are located in Appendix I.

Essential Fish Habitat. The 1996 amendments to the Magnuson-Stevens Act set forth a number of new mandates for the National Oceanic and Atmospheric Administration (NOAA) Fisheries, eight regional fishery management councils (Councils), and other federal agencies to identify and protect important marine and anadromous fish habitat. The Councils, with assistance from NOAA Fisheries, are required to delineate Essential Fish Habitat (EFH) for all managed species. Federal agencies which fund, permit, or carry out activities that may adversely impact EFH are required to consult with NOAA Fisheries regarding the potential effects of their actions on EFH, and are required to respond in writing to NOAA Fisheries recommendations. The proposed project is located within an area designated as EFH for Pacific Salmon, Pacific Groundfish and Coastal Pelagic species. In the April 29, 2016 Letter of Concurrence, NOAA Fisheries determined that the proposed action would adversely affect Pacific Salmon, Pacific Groundfish and Coastal Pelagic species EFH. However, NOAA Fisheries concluded there are no practical measures that could be taken to further minimize or avoid those effects than already incorporated into the design and proposed by Caltrans. Therefore, NOAA FISHERIES has not provided EFH Conservation Recommendations at this time. (See page 46 of BO paragraph 2).

Section 106 Compliance. For projects with federal funding, the National Historic Preservation Act of 1966 (NHPA), as amended by 16 United States Code (USC) Section 470 et seq.; Section 106; 36 Code of Federal Regulations (CFR) Part 800, includes provisions for protection of significant archaeological and historical resources. Procedures for dealing with previously unsuspected cultural resources discovered during construction are identified in 36 CFR 800 (for implementing Section 106 processes). The administering agency is the State Historic Preservation Office (SHPO) and the Federal Highway Administration (working in cooperation with Caltrans). **Status:** Section 106 process was finalized and a letter of concurrence from the SHPO was received November 29, 2006.

Coastal Development Permits. Pursuant to the California Coastal Act of 1976, any proposed development within the Coastal Zone requires a Coastal Development Permit. The Coastal Act was established to protect public and private property, wildlife, marine fisheries, other ocean resources, and the natural environment. For this project, Coastal Development Permits would be required from the State, County of Humboldt, City of Arcata, and the City of Eureka as this project lies within four Coastal Zone agency jurisdictions. However, Caltrans would likely request consolidating the permit jurisdictions and apply for one Coastal Development Permit from the California Coastal Commission. **Status:** Coordination with California Coastal Commission staff is ongoing. Caltrans obtained Federal Coastal Consistency Certification on November 14, 2013. Permit application is to be submitted following final environmental document approval, and prior to construction.

General Bridge Act of 1946. This law requires the U.S. Coast Guard to approve the location and plans of bridges prior to start of construction (33 U.S.C. 525). **Status:** Permit application is to be submitted following final environmental document approval, and prior to construction.

NPDES / Storm Water Pollution Prevention Plan (SWPPP) Permit. The National Pollutant Discharge Elimination System (NPDES) permit system was established in the Clean Water Act to regulate municipal and industrial discharges to surface Waters of the U.S. The statewide NPDES permit issued to Caltrans contains limits on allowable concentrations and mass emissions of pollutants contained in the discharge. Sections 401 and 402 of the CWA contain general requirements regarding the

NPDES permit. **Status:** The construction contractor working with Caltrans would submit a Notice of Intent to prepare a SWPPP after final project approval, but prior to construction.

California Department of Fish and Wildlife. Section 1602 of the California Fish and Game Code requires a Streambed Alteration Agreement from the California Department of Fish and Wildlife (CDFW) for activities that would divert, obstruct or change the natural flow, or adversely affect the bed, channel or bank of a stream and its associated fish and wildlife values, including contiguous riparian habitat. **Status:** Coordination with Fish and Wildlife staff is ongoing. Permit application is to be submitted following final environmental document approval, and prior to construction.

Humboldt Bay Harbor Recreation and Conservation District. A permit from this agency is required for replacing the southbound Jacoby Creek bridge. **Status:** Permit application is to be submitted following final environmental document approval, and prior to construction.

Other Public Agency Permits. Other federal, state, and local agencies' permits including, but not limited to, the following may be needed for project implementation:

- State Lands Commission permit
- State Department of Toxic Substances Control
- County of Humboldt Coastal Development Permit
- City of Arcata Coastal Development Permit
- Regional Air Quality Management District Permit
- Applicable city/county encroachment permits

Areas of Concern. Many comments were received during the public meetings and circulation of the draft Environmental Impact Report/Statement. The following is a summary of concerns raised:

1. ***Project need and purpose.*** Many comments questioned the need for the safety component of the project; commenters questioned the perceived success of the existing Safety Corridor.

2. ***Climate change/sea level rise.*** Many comments reflected a need to address climate change and sea level rise issues. The project is primarily located within the floodplain of Humboldt Bay on former tidelands. While the purpose of the project is not to address impacts to the highway system from sea level rise, the structures are designed to account for future sea level rise. The Jacoby Creek Bridge will be designed so that the bridge deck will be above the estimated elevation of the highest sea level rise during high tide. The Indianola Interchange is above the projected sea level rise and will be designed in such a way that it can be raised in the future if necessary.

Caltrans worked with other local agencies to produce a District 1 Climate Change Vulnerability Assessment (2014), which included a pilot study on the Eureka – Arcata Corridor. The Coastal Commission issued a Federal Coastal Consistency Determination in 2013 which included a condition related to planning for Sea Level Rise, and Caltrans is working with the Coastal Commission and other agencies and government entities to plan for Sea Level Rise.

3. ***Bicycle/pedestrian facilities within the corridor.*** Many comments requested the inclusion of bicycle/pedestrian facilities as part of the proposed project.

4. ***Access restrictions and out-of-direction travel.*** Many comments reflected a need to maintain the existing access openings for businesses in order to avoid out-of-direction travel for both businesses and residents.

For more information regarding these issues and others, including Caltrans' responses to the comments, please refer to Chapter 5 - Summary of Public/Agency Involvement Process / Tribal Coordination, as well as Volume II of the Final EIR/S.

Definitions and Acronyms Used In This Document

Definitions

Abutment - A stone, concrete, brick, or timber structure supporting the end of a span.

Attainment area - An area that meets air quality standards.

Attenuation - The reduction of noise.

Biological Opinion - A document that is the product of formal consultation, stating the opinion of the USFWS on whether or not a federal action is likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of critical habitat.

California Department of Fish and Wildlife (CDFW) - The state agency that manages California's wildlife and plant resources.

California Department of Transportation (Caltrans) - Responsible for planning, designing, building, operating, and maintaining California's state highway system.

Candidate species - Any species of fish, wildlife, or plant which has been determined to be a candidate for listing under Section 4 of the Endangered Species Act of 1973 (amended).

Coastal Zone Management Act (CZMA) - The CZMA regulates development in coastal areas to protect the unique resources in such areas.

Cofferdam - A temporary water-tight enclosure built in the water and pumped dry to expose the bottom so that construction of piers can be undertaken.

Column - A supporting pillar.

Contaminant source - A facility that treats, stores, or disposes of hazardous waste, uses hazardous substances, or stores petroleum products on site.

Cultural resources - Archaeological and historic resources eligible for or listed on the National Register of Historic Places. Cultural resources include buildings, sites, districts, structures, or objects having historical, architectural, archaeological, cultural, or scientific importance.

Cut Slope - Creating level areas for a road by excavating into a slope.

dBA - A sound level in decibels, measured with a sound level meter having metering characteristics and frequency weighting specified in American National Standard Specifications for sound level meters (ANSI S1.4-1971). It is common to refer to numerical units of an A-weighted sound level as "dBA."

Deck - The portion of a bridge that provides direct support for vehicular, bicycle, and/or pedestrian traffic.

Draft Environmental Impact Report/Statement (DEIR/S) - A draft report that analyzes potential environmental impacts of a proposed project in compliance with both CEQA and NEPA.

Endangered species - Any species of wildlife or plant which has been determined to be endangered under Section 4 of the U. S. Endangered Species Act of 1973 (amended). This definition is adopted from the USFWS, Section 7 regulations, 51 FR 19926.

Equivalent Sound Level (L_{eq}) - A measure of sound energy over a period of time, or a sound level which, in a stated period of time, would contain the same acoustical energy as the time-varying sound during the same period.

Expressway - An expressway is a high-speed divided highway for through traffic with access partially controlled. A controlled access facility is a roadway where the spacing and design of driveways, medians, median openings, traffic signals and intersections are strictly regulated by consideration of such factors as traffic volume and number of lanes, which gives preference to through traffic. (Compare with freeway definition.)

4(f) resources - Resources protected by Section 4(f) of the Department of Transportation Act. These include public park and recreation lands, wildlife and waterfowl refuges, and historic sites eligible or listed on the National Register.

False work - A temporary wooden or metal framework built to support a structure under construction until that structure is self-supporting.

Federal Aviation Administration (FAA) - The federal agency that issues and enforces regulations and standards related to the manufacture, operation, certification, and maintenance of aircraft.

Federal Highway Administration (FHWA) - The federal agency that coordinates highway transportation programs in cooperation with states and other partners. It provides federal financial assistance to the States to construct and improve the National Highway System, urban and rural roads, and bridges.

Fill - Earth used to create embankments or to raise low-lying areas in order to bring them to grade. Under the Clean Water Act (USACE jurisdiction), fill is defined as material used for the primary purpose of replacing an aquatic area with dry land, or a change in the bottom elevation of a water body.

Fill slope - The surface formed where earth is deposited to build or expand a road.

Final Environmental Impact Report/Statement (FEIR/S) - A joint CEQA and NEPA document that responds to comments received on the DEIR/S and provides updated information that has become available after publication of the DEIR/S.

Floodplain - The part of the ground surface inundated with water on a recurring basis, usually associated with the 1 percent recurrence interval (100-year) flow.

Footing - The enlarged, or spread-out, lower portion of a substructure, which distributes the structure load either to the earth or to supporting piles.

Foundation - The supporting material upon which the substructure portion of a bridge is placed.

Freeway - a divided arterial highway with full control of access and with grade separations at intersections.

General Plan – A city or county document that contains planning policies used to implement the goals of a community.

Geomorphic - Of the earth's surface configuration.

Grade - A slope or gradual incline.

Grade Separation - A crossing of two highways or a highway and a railroad at different levels. In this document, grade separation refers to non-freeway crossings. Compare to interchange definition.

Groundwater - Subsurface water occurring in saturated soil and rock.

Inundation - The act of covering with water.

Interchange - A system of interconnecting roadways in conjunction with one or more grade separations providing for the inter-change of traffic between two or more roadways on different levels. In this document an interchange refers to grade separated connections on freeways. Compare to definition of grade separation.

Landscape unit - A geographically distinct portion of an area that has a particular visual character.

Least Environmentally Damaging Practicable Alternative (LEDPA) - Section 404 (b)(1) under the Federal Clean Water Act process requires USACE and EPA to make a determination of the LEDPA for any action involving discharge of dredge or fill material into Waters of the U.S.

Level of Service (LOS) - The operating level of an intersection or roadway segment can be described using the term Level of Service. LOS is a qualitative description of operation based on delay and maneuverability. It can range from "A" representing free flow conditions to "F" representing gridlock. (See Appendix B for more information.)

Liquefaction - The loss of support strength that can occur in loose, saturated soil during or following seismic shaking. This condition can produce a number of ground effects, including lateral spreading, boils, ground lurching, and settlement of fill material.

Marine Mammal Protection Act - Provides for the protection and conservation of marine mammal species.

Maximum Credible Earthquake (MCE) - The largest earthquake reasonably capable of occurring based on current geological knowledge.

Migratory Bird Treaty Act of 1918 - Reflects agreements involving the United States, Great Britain (for Canada), Mexico, Japan, and the former Soviet Union to protect migratory bird populations.

Mitigation - Measures taken to minimize adverse environmental impacts. Mitigation could reduce the magnitude and extent of an impact from a level of significance to a level of insignificance.

National Environmental Policy Act (NEPA) - The United States' basic national charter for protection of the environment. It establishes policy, sets goals, and provides means for carrying out the policy.

National Historic Preservation Act of 1966 - The primary federal law pertaining to protection of cultural resources, referred to as Section 106.

National Oceanic and Atmospheric Administration (NOAA) Fisheries - oversees the programs which support the domestic and international conservation and management of living marine resources.

National Register eligible - Cultural resources eligible for inclusion on the National Register of Historic Places.

National Register of Historic Places - A federal listing of historic resources protected under the National Historic Preservation Act of 1966.

Non-attainment area - An area that does not meet air quality standards.

Noise Abatement Criteria - Noise level standards above which noise reducing actions should be considered.

Pier - A structure composed of stone, concrete, brick, steel or wood and built in shaft or block-like form to support a bridge between its abutments.

Pile - A rod or shaft-like linear member driven into the earth as a foundation or support for a structure.

Post Mile (PM) - Post Miles are used as a reference system to aid in the planning, design, construction, and operation of the state highway system. The Post Mile starts at zero at the county boundary and increases east or north.

Record of Decision (ROD) - A public document that explains the reasons for a project decision and summarizes any mitigation measures that would be incorporated in the project.

Right-of-way - Land, property, or interest therein, acquired for infrastructure such as a highway, rail bed, pipeline, electric power lines, or telephone facilities. The land has been set aside as an easement or in fee, either by agreement or by condemnation.

Riparian - An aquatic or terrestrial ecosystem that is associated with bodies of water, such as streams, lakes, or wetlands, or is dependent upon the existence of perennial, intermittent, or ephemeral surface or subsurface water drainage. Riparian areas are usually characterized by dense vegetation and an abundance and diversity of wildlife.

Salmonid (fish) - Belonging or pertaining to the family *Salmonidae*, including the salmons and trouts. All of the native salmonid fish that inhabit the project area are special status species.

Silt - A sedimentary material consisting of fine mineral particles ranging in size between sand and clay.

Special status species - Any species of fish, wildlife, or plant that is officially listed as Rare, Threatened, Endangered, or is a candidate for Rare, Threatened, or Endangered species listing under the state or federal Endangered Species Acts.

State Office of Historic Preservation - The state agency that assists private citizens, private institutions, local governments, and state and federal agencies in the identification, evaluation, protection, and enhancement of properties significant in

California history and archaeology; also responsible for reviewing federal undertakings that affect cultural resources on or eligible for the National Register of Historic Places.

Substructure - The abutments, piers, or other constructions built to support the span or spans of a bridge. The superstructure is supported by the substructure; the substructure is placed on the foundations.

Superstructure - The entire portion of the bridge structure that primarily receives and supports highway, railway or other traffic loads. It is supported by the substructure.

Surface runoff - Water that runs off streets and land and enters a body of water.

Traffic Management Plan - A plan to manage traffic during project construction activities to avoid or reduce congestion and delay.

U.S. Army Corps of Engineers (USACE) - Federal agency with jurisdiction over Waters of the U.S. Waters of the United States as defined by the Clean Water Act include navigable waters, interstate waters, territorial seas and other waters that may be used in interstate or foreign commerce.

U.S. Coast Guard (USCG) - Federal agency with jurisdiction over navigable waterways.

U.S. Environmental Protection Agency (EPA) - The federal agency responsible for maintaining environmental quality, including air quality, noise, and hazardous waste management.

U.S. Fish and Wildlife Service (USFWS) - The federal agency that administers the federal Endangered Species Act and is involved in protection of fish and wildlife habitat, including wetland areas.

Waters of the United States - Defined by the Clean Water Act that includes navigable waters, interstate waters, territorial seas and other waters that may be used in interstate or foreign commerce.

Weaving - This term describes the interaction of two traffic streams moving in the same direction merging and then diverging in a relatively short distance. In other words, crossings of portions of traffic streams must occur.

Weaving Length - The distance between an on ramp and the next off ramp or intersections, in which traffic entering the highway must merge with through traffic, and exiting traffic must change lanes (weave) or stay in the outside lane in order to use the off ramp or exit.

Wetlands - According to regulations of the U.S. Army Corps of Engineers, wetlands are areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, under normal conditions, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, and similar areas and are subject to protection under Executive Order 11990 and Section 404 of the Clean Water Act.

Since this project is within the Coastal Zone, the California Coastal Commission, as well as the County of Humboldt, the City of Arcata, and the City of Eureka would also regulate coastal wetlands. In California, lands within the Coastal Zone that exhibit even a single wetland parameter or characteristic (sufficient hydrology, hydric soil, or predominance of hydrophytic vegetation) are deemed wetland by the California Coastal Commission. Coastal wetlands are inclusive of USACE wetlands. Less-than-three parameter wetlands are present in the project area at the upland edges of the Estuarine Intertidal Scrub/Shrub Wetland (within the highway median and right-of-way).

Acronyms

101 CAP	101 Corridor Access Project Group
AADT	Average Annual Daily Traffic
AASHTO	American Association of State Highway and Transportation Officials
ACHP	Advisory Council on Historic Preservation
ADA	American with Disabilities Act
ADI	Area of Direct Impact
ADL	Aerially Deposited Lead
ADT	Average Daily Traffic
APE	Area of Potential Effects
ASR	Archaeological Survey Report
AVMT	Average Vehicle Miles Traveled
BA	Biological Assessment
BMPs	Best Management Practices
BO	Biological Opinion
BSA	Biological Study Area
Btu	British thermal unit
CAA	Federal Clean Air Act
CAAA	Clean Air Act Amendments
CAC	Citizen Advisory Committee
Cal/EPA	California Environmental Protection Agency
Cal-EPPC	California Exotic Pest Plant Council
Cal-IPC	California Invasive Plant Council
Caltrans	California Department of Transportation
CARB	California Air Resources Board
CCAA	California Clean Air Act
CCC	California Coastal Commission
CCT	California Coastal Trail
CDFW	California Department of Fish and Wildlife
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CEQ	Council on Environmental Quality
CEQA	California Environmental Quality Act

CESA	California Endangered Species Act
CFR	Code of Federal Regulations
CHP	California Highway Patrol
CMP	Conceptual Mitigation Plan
CMVSTAFF	California Motor Vehicle Stock Travel and Fuel Forecast
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Survey
CO	Carbon Monoxide
CO-CAT	Coastal Ocean Climate Action Team
CRPR	California Rare Plant Ranks
CTC	California Transportation Commission
CTP	California Transportation Plan
CWA	Clean Water Act
CWPAP	Coastal Watershed Planning and Assessment Program
CZMA	Coastal Zone Management Act
CZMP	Coastal Zone Management Program
dB	Decibel
dBA	A-weighted decibel
dBA L_{eq}	A-weighted decibel equivalent sound level
DEIR	Draft Environmental Impact Report
DEIR/S	Draft Environmental Impact Report/Statement
DEIS	Draft Environmental Impact Statement
DPS	Distinct Population Segment
DSA	Disturbed Soil Area
DTSC	California Department of Toxic Substances Control
DWR	Department of Water Resources
EFH	Essential Fish Habitat
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EO	Executive Order
EPA	(U.S.) Environmental Protection Agency
ESA	Environmentally Sensitive Area
ESU	Evolutionary Significant Unit

FAA	Federal Aviation Administration
FCAA	Federal Clean Air Act
FCWA	Federal Clean Water Act
FEIS	Final Environmental Impact Statement
FEMA	Federal Emergency Management Agency
FESA	Federal Endangered Species Act
FHWA	Federal Highway Administration
FIRM	Flood Insurance Rate Maps
FPPA	Farmland Protection Policy Act
FSTIP	Federal Statewide Transportation Improvement Program
FTA	Federal Transit Administration
FTIP	Federal Transportation Improvement Programs
GHG	Greenhouse gas (emissions)
H_2S	Hydrogen sulfide
HASR	Historic Architecture Survey Report
HBAM	Humboldt Bay Area Mitigation
HCAOG	Humboldt County Association of Governments
HCM	Highway Capacity Manual
HPSR	Historic Property Survey Report
HWCL	Hazardous Waste Control Law
IRIS	Integrated Risk Information System
ISTEA	Intermodal Surface Transportation Efficiency Act
ITIP	Interregional Transportation Improvement Program
ITS	Intelligent Transportation System
L_{10}	Noise level equaled or exceeded 10 percent of the time
L_{eq}	Equivalent Sound Level
L_{max}	Maximum Sound Level
LCP	Local Coastal Program
LEDPA	Least Environmentally Damaging Practicable Alternative
LOS	Level of Service
LRFD	Local Resistance Factor Design
LUST	Leaking Underground Storage Tank
MBTA	(Federal) Migratory Bird Treaty Act

MCE	Maximum Credible Earthquake
mg/L	Milligrams per Liter
mg/m^3	Milligrams per Cubic Meter
MHTL	Mean High Tide Line
MHW	Mean High Water
MLD	Most likely descendant
MLLW	Mean Lower Low Water
MLW	Mean Low Water
MOU	Memorandum of Understanding
mph	Miles per hour
MPO	Metropolitan Planning Organization
MPRSA	Marine Protection, Research, and Sanctuaries Act
MSATs	Mobile source air toxics
MSFCMA	Magnuson-Stevens Fishery Conservation and Management Act
MSL	Mean Sea Level
MTC	Metropolitan Transportation Commission
MTL	Mean Tide Level
NAAQS	National Ambient Air Quality Standards
NAC	Noise Abatement Criteria
NAHC	Native American Heritage Commission
NB	Northbound
NCRA	North Coast Railroad Authority
NCUAQMD	North Coast Unified Air Quality Management District
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NHTSA	National Highway Traffic Safety Administration
NMFS	National Marine Fisheries Service (NOAA Fisheries)
NNL	National Natural Landmarks
NO_2	Nitrogen dioxide
NOAA	National Oceanic and Atmospheric Administration – Fisheries Service
NOD	Notice of Determination
NOI	Notice of Intent
NOP	Notice of Preparation

NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NS	Non-Stormwater Management
NWPRR	Northwestern Pacific Railroad
O_3	Ozone
OHWL	Ordinary High Water Level
OSHA	Occupational Safety and Health Administration
OSTP	Office of Science and Technology Policy
Pb	Lead
PCBs	Polychlorinated biphenyls
PCBR	Pacific Coast Bike Route
PCR	Primary constituent elements
PDT	Project Development Team
PEM	Palustrine Emergent Wetland
PID	Project Initiation Document
PM	Particulate Matter
$PM_{2.5}$	Particulate Matter with an aerodynamic diameter less than 2.5-micrometers (µm); a micrometer is one millionth of a meter
PM_{10}	Particulate Matter with an aerodynamic diameter less than 10-micrometers (µm)
ppm	Parts per Million
PRC	(California) Public Resources Code
PSD	Prevention of Significant Deterioration
PSR	Project Study Report
PVD	Prefabricated Vertical Drains
ROD	Record of Decision
RCAA	Redwood Community Action Agency
RCRA	Resource Conservation and Recovery Act
REAP	Rain Event Action Plans
ROWD	Report of Waste Discharge
RRR	Resurface, Restore, and Rehabilitate
RSA	Resource Study Area

RSP	Rock Slope Protection
RTP	Regional Transportation Plan
RTPA	Regional Transportation Planning Agency
RWQCB	Regional Water Quality Control Board
SB	Southbound
SB	Senate Bill
SC	Sediment control
SCCRTC	Santa Cruz County Regional Transportation Commission
SCS	Sustainable Communities Strategy
SHOPP	State Highway Operations and Protection Program
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SLR	Sea Level Rise
SO_2	Sulfur dioxide
SONCC	Southern Oregon/Northern California Coast
SS	Soil stabilization
STIP	State Transportation Improvement Program
SVOC	Semi-Volatile Organic Compound
SWDR	Stormwater Data Report
SWMP	Stormwater Management Plan
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TASAS	Traffic Accident Surveillance and Analysis System
TIP	Transportation Improvement Program
TMDL	Total maximum daily load
TMP	Transportation Management Plan
TPH	Total Petroleum Hydrocarbons
TRPH	Total Recoverable Petroleum Hydrocarbons
TSCA	Toxic Substance Control Act
TSN	Transportation System Network
TSM	Transportation System Management
USACE	U.S. Army Corps of Engineers
USC	United States Code

USCG	U.S. Coast Guard
USDOT	United States Department of Transportation
USEPA	(U.S.) United States Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	United States Geological Survey
UST	Underground Storage Tank
VA	Value Analysis
VAR	Value Analysis Study Report
VMT	Vehicle Miles Traveled
VOC	Volatile Organic Compound
VROOM	Variety in Rural Options of Mobility
WDR	Waste Discharge Requirement
WE	Wind Erosion Control
WET	Wetland Evaluation Technique
WM	Waste Management
WPCP	Water Pollution Control Plan
$\mu g/m^3$	Micrograms per Cubic Meter (a microgram is a millionth of a gram)
µg/L	Micrograms per Liter

Volume I
Final Environmental Impact Report/Statement

Table of Contents

Appendices can be found in Volume II, and public written comments and responses can be found in Volume III and IV of the Final Environmental Impact Report/Statement.

List of Figures

List of Tables

Chapter 1 Project Need and Purpose

1.1 Introduction

Caltrans and FHWA propose to make improvements to Route 101 between the Eureka Slough bridge in Eureka and the 11th Street overcrossing in Arcata (post miles 79.9 to 86.3) in Humboldt County. See Project Location Map Figures S-1, 2, and 3 in the preceding Summary section. After the environmental documentation process and obtaining all required public agency permits is completed, project construction is tentatively scheduled to start in year 2019 and completed in 2021.

The existing Route 101 corridor consists of a four-lane expressway north of the Eureka Slough bridge (post mile 79.8) to the Gannon Slough bridge (post mile 84.7). (An "expressway" is a high-speed divided highway for through traffic with access partially controlled. A "controlled access" facility is a roadway where the spacing and design of driveways, medians, median openings, traffic signals and intersections are strictly regulated by consideration of such factors as traffic volume and number of lanes, which gives preference to through traffic.) North of the Gannon Slough bridges, Route 101 is a four-lane freeway up to and beyond the northern project limit at the Route 101/255 interchange in the city of Arcata. (A freeway is a high-speed divided highway for through traffic with fully controlled access - i.e., only grade-separated interchanges provide access to local roads.) The current posted speed limit for the expressway segment is 50 mph, and 65 mph for the freeway segment.

The existing Route 101 roadway has the following typical dimensions:

- One 12-foot wide lane and one 11-foot wide lane in each direction within the expressway segment between the Eureka Slough bridges and Gannon Slough bridges
- Two 12-foot wide lanes in each direction within the freeway segment north of the Gannon Slough bridges
- 4 feet wide inside and 10 feet wide outside paved shoulders
- A median varying in width from 22 to 80 feet wide

There are currently seven at-grade Route 101 local street/driveway access locations within the expressway segment of Route 101 between Eureka and Arcata. (See Figure S-1 in the Summary and Plan Sheets in Appendix A.) Six of these access locations currently have Route 101 median crossings that allow for left turn on and off movements, to and from the local streets/driveways. (See Figure S-3 – Route 101 Existing Open Median Locations.) At Route 101 and Cole Avenue the Route 101 median opening was closed to traffic in 2003 at this location; only right turn off movements from northbound Route 101 and right turn on movements to Route 101 vehicle movements are permitted. Cole Avenue connects to Jacobs Avenue.

From south to north, these six access (median opening) locations are described as follows:

- Airport Road – The Route 101 median is currently open and all turn movements to and from Route 101 at this intersection are permitted. Northbound to southbound Route 101 U-turns are prohibited at this intersection. The deceleration and acceleration lanes at this intersection were extended and improved in 2003. Airport Road connects to Jacobs Avenue on the east side of Route 101.

- Mid-City Motor World – On the east side of Route 101, a private driveway connects Route 101 to this car dealership as well as a Fish and Wildlife Refuge. The Route 101 median is currently open and all turn movements to and from Route 101 at this intersection are permitted. The deceleration and acceleration lanes at this intersection currently do not meet highway design standards for both length and shoulder width.

- California Redwood Company (formerly Simpson) – On the west side of Route 101, a private driveway connects Route 101 and the mill. The Route 101 median is currently open and all turn movements to and from Route 101 at this intersection are permitted. The deceleration and acceleration lanes at this intersection currently do not meet highway design standards for length or width.

- Indianola Cutoff – The Route 101 median is currently open and all turn movements to and from Route 101 at this intersection are permitted. Indianola Cutoff connects Route 101 to Old Arcata Road to the east of Route 101. The deceleration and acceleration lanes at this intersection currently do not meet highway design standards for both length and shoulder width.

- Bracut – The Route 101 median is currently open and all turn movements to and from Route 101 at this intersection are permitted. There are businesses on both sides of Route 101 at this location. The deceleration and acceleration lanes at this intersection currently do not meet highway design standards for length or width.

- Bayside Cutoff – The Route 101 median is currently open and all turn movements to and from Route 101 at this intersection are permitted. Bayside Cutoff connects Route 101 to Old Arcata Road to the east. The deceleration and acceleration lanes at this intersection currently do not meet highway design standards for both length and shoulder width.

North of the Gannon Slough bridges, and continuing through the city of Arcata, the expressway changes to a four-lane freeway with a posted 65 mph speed limit.

The proposed project would improve safety and reduce operational conflicts and traffic delays at Route 101 intersections between Eureka and Arcata by:

- Eliminating uncontrolled left turn movements;
- Eliminating uncontrolled Route 101 median crossing movements;
- Extending or constructing right-turn acceleration and deceleration lanes.

For Modified Alternative 3A (identified as the Preferred Alternative), major project features include closing roadway median crossings, constructing a grade separation at Indianola Cutoff, replacing southbound Jacoby Creek bridge, and constructing a half signal at the Route 101/Airport Road intersection. See Figure S-4 – Overview of Alternatives in the Summary section of this document. The project Alternatives are described in detail in Chapter 2.

1.2 Project Need and Purpose

The project need consists of the transportation problems and deficiencies to which Caltrans, FHWA, and the Humboldt County Association of Governments (HCAOG) are responding. This section describes and quantifies concerns including safety, traffic operating conditions, long-term roadway maintenance, and highway design standards. The statement of project need, together with the purpose, provides focus to the identification, development, and evaluation of the project Alternatives.

Project Need: Reduce Collisions

Vehicle collision data is maintained on all state highways. For Route 101 between Eureka and Arcata, collision rates at multiple intersections exceed the statewide averages for similar highway intersections and the number of collisions was statistically significant;: thus, a traffic safety analysis was performed for this location. The analysis included studying individual California Highway Patrol collision reports and looking for possible common collision types and collision factors. The analysis indicated that safety concerns exist at intersections within the Eureka-Arcata Route 101 Corridor. The majority of collisions resulting in serious injuries or fatalities on Route 101 between Eureka and Arcata were the result of left turning vehicles attempting to cross high-speed high volume traffic at Route 101 intersections.

Reported collisions at the Route 101 intersections during the five-year period from May 19, 1997 to May 18, 2002 included five fatal collisions and 44 injury collisions out of 85 total collisions. The five-year total collision rate exceeded the statewide average (for similar intersections) at all of the public access locations (Cole Avenue, Airport Road, Indianola Cutoff, and Bayside Cutoff) and at one of three private access locations (Mid-City Motor World). See Figure 1-1. The fatal plus injury collision rate exceeded the statewide average at all four public access locations (Cole Avenue, Airport Road, Indianola Cutoff, and Bayside Cutoff) and at one of the three private access locations (Mid-City Motor World). See Figure 1-2. (*Source: Caltrans, Transportation Systems Network, District 1 Traffic Safety, no date)* To address the incidence of high rate of collisions, the State was required to evaluate and implement improvements in the interest of public safety.

In 2002, Caltrans, in cooperation with HCAOG and in partnership with state and local law enforcement agencies, implemented a Safety Corridor as an interim measure to address safety concerns on Route 101 on the five-mile expressway segment between Eureka and Arcata. The Safety Corridor included such measures as reducing the posted speed limit from 60 mph to 50 mph and a daylight use of headlights section. During the Safety Corridor's first year, there were 45 percent fewer collisions (including 80 percent fewer collisions at intersections) when compared to the Safety Corridor five-year baseline, averaged over the period from January 1, 1996 to December 31, 2000. *(Source: Eureka-Arcata Safety Corridor, 1st Annual Report. Caltrans District 1 Traffic Safety, June 18, 2003)*

Figure 1-1 compares the average collision rates of all collision types (fatal, injury, and property damage only) at the Route 101 intersections for two five-year periods before and after the establishment of the Safety Corridor. Prior to the Safety Corridor, the collision rate five-year averages were higher than the statewide average (for similar highway intersections) at four of the six intersections. After implementation of the Safety Corridor, collision rate five-year averages at Mid-City Motor World and Indianola Cutoff remain above statewide averages; in fact, the collision frequency at Mid-City Motor World and Indianola Cutoff are actually higher than prior to the Safety Corridor.

While Figure 1-1 shows the frequency of all collision types, Figure 1-2 summarizes the average rates of severe collisions for the same time periods as Figure 1-1. Collisions are considered severe if they result in injuries or fatalities. The incidence of severe collisions is similar to that of all collisions in Figure 1-1; namely, the collision rate five-year averages remain higher than statewide average rates (for similar intersections) at Mid-City Motor World and Indianola Cutoff after the Safety Corridor.

Both Figures 1-1 and 1-2 illustrate that even with a Safety Corridor in place for seven years, collision rates above statewide averages occur at two of the intersections: Mid-City Motor World and Indianola Cutoff. (Note: Figures 1-1 and 1-2 do not include the period between May 2002 and May 2004.) Even though the Safety Corridor enhances safety overall, the possibility of severe collisions from left turn movements remain. When collision history frequency and severity is highly elevated in spite of safety measures already in place (such as the Safety Corridor), the State evaluates improvements in the interest of public safety. A collision analysis from 2002 through 2008 (six full years with the Safety Corridor in place) at Indianola Cutoff shows that:

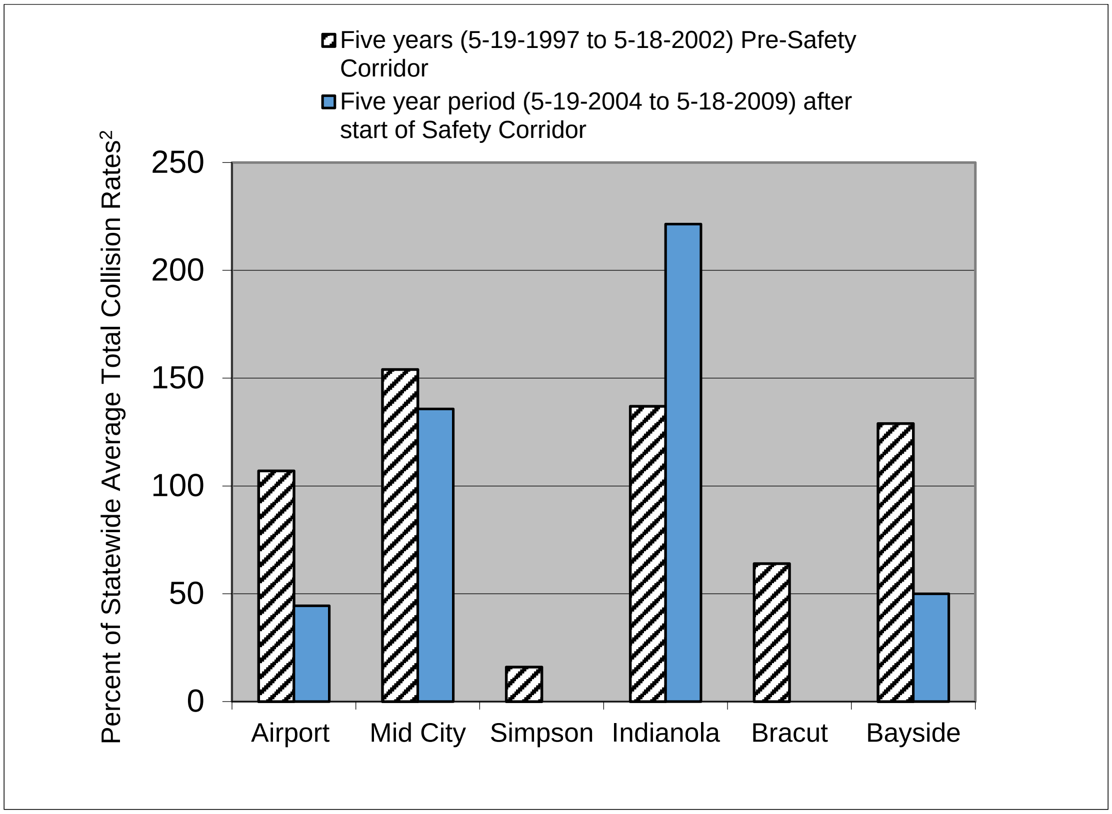
- 21 reported collisions occurred;
- 52 percent of the collisions resulted in injuries;
- Over 70 percent of the collisions involved cross-median movements.

(Source: Caltrans Eureka-Arcata Safety Corridor Fifth/Sixth-year Report (2002-2008), no date)

As the 2002-2008 collision data indicates, collisions are still occurring even after implementation of the Safety Corridor in 2002. Traffic volumes are expected to increase on Route 101 between Eureka and Arcata, which would result in shorter and fewer traffic gaps for left turn movements. The average annual daily traffic is expected to increase from 37,000 vehicles per day in 2014 to 50,000 by 2041. This traffic increase is explained in the next section.

In addition to and related to left turn movements, there are numerous factors that can contribute to higher levels of injury collisions at Route 101 intersections. During peak travel periods, vehicles can form long lines in left turn lanes on Route 101 or on crossroads waiting to make left turns across oncoming Route 101 traffic. (See Figure 1-5.) When traffic is light, most drivers can wait for suitable gaps in oncoming traffic to make left turns. However, when traffic is heavy and drivers are waiting in the left turn lane, drivers sometimes attempt to complete left turns within shorter traffic gaps than they normally would accept. In addition, impaired vision and judgment of aging drivers, as well as inexperienced drivers and reduced driver visibility during heavy rain or fog, can further hinder drivers crossing Route 101 safely at intersections. Without improvements, an increase in collision frequency could occur within one of the most heavily traveled segments of Route 101 within the North Coast counties of Mendocino, Humboldt, and Del Norte. *(Source: Caltrans 2011 Traffic Volumes on the California State Highway System, no date)*

Figure 1-1 Average Total Collision Rates at Route 101 Intersections as a Percentage of Statewide Average Rates[1, 3]



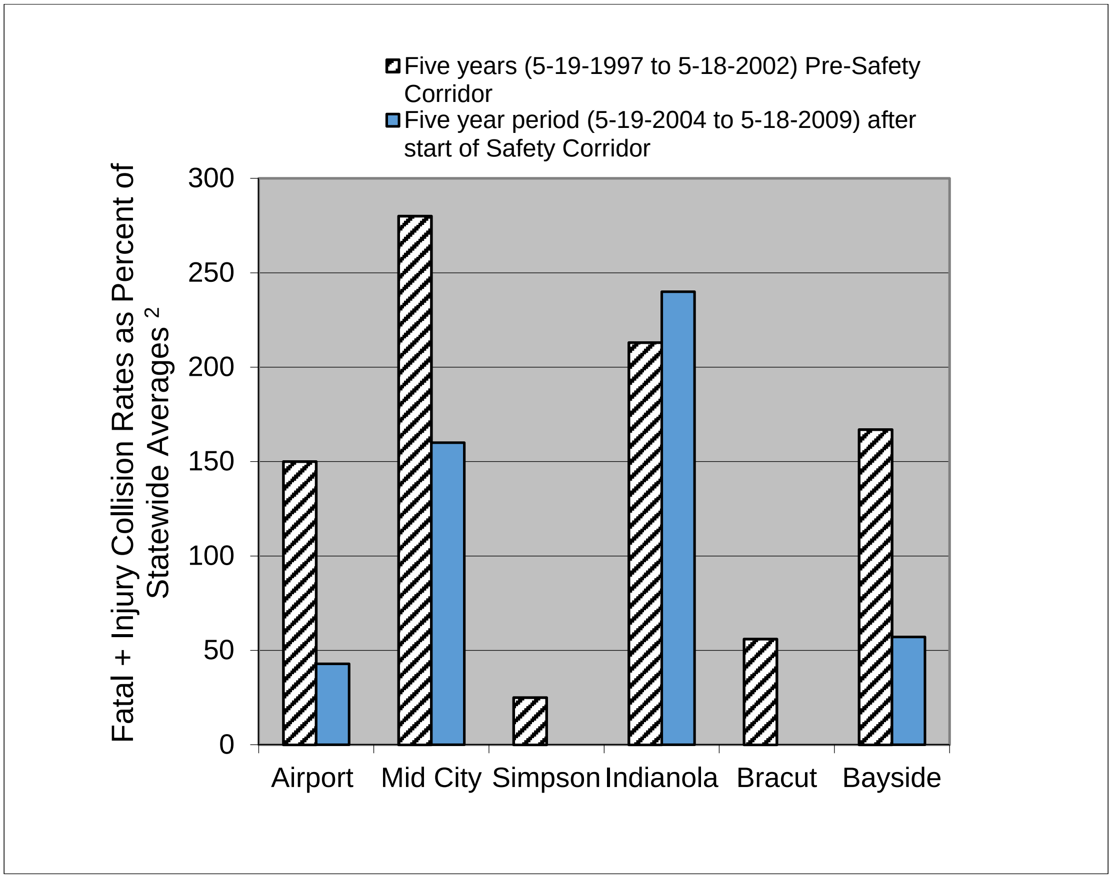
Note 1: Total collisions consist of all types of collisions: fatal, injury and property damage

Note 2: For intersections, collision rates are a measure of the number of collisions per million vehicles. One hundred represents the percentage of the statewide average collision rate for similar highway intersections.

Note 3: The Safety Corridor was started on May 19, 2002.

Source: Collision Data obtained from Caltrans Transportation System Network (TSN) by District 1 Traffic Safety

Figure 1-2 Average Severe Collision Rates at Route 101 Intersections as a Percentage of Statewide Average Rates[1, 3]



Note 1: Severe collisions consist of fatal and injury collisions.

Note 2: For intersections, collision rates are a measure of the number of collisions per million vehicles. One hundred represents the percentage of the statewide average collision rate for similar highway intersections.

Note 3: The Safety Corridor was started on May 19, 2002.

Source: Collision Data obtained from Caltrans Transportation System Network (TSN) by District 1 Traffic Safety

Project Need: Reduce Route 101 Operational Conflicts – Left Turn Traffic Movements

Left Turns Across Route 101 to Access or Exit Private Businesses and Local Roads

One type of highway "operational conflict" occurs when vehicles at intersections turn across opposing traffic lanes. On Route 101, operational conflicts can occur as a result of uncontrolled left turn movements at six existing median crossings within the Route 101 Corridor. Left turns require motorists to monitor gaps in traffic from the Route 101 through lanes, slower moving bicyclists in the shoulders, and left turns on (or off) Route 101. These types of operational conflicts can occur within one of the most heavily traveled segments on Route 101 within Humboldt County. In addition, traffic flow along Route 101 through lanes is impeded when drivers leave left turn pockets and return to the through traffic lanes; this occurs when drivers are unable to cross Route 101 travel lanes because they perceive there are insufficient traffic gaps or because the wait to turn is too long. Commercial trucks, which comprise approximately 4.6 percent to 6.7 percent of the total traffic on Route 101, can dominate left turn pockets and require longer traffic gaps to complete left turn movements. (*Source: 2010 Annual Average Daily Truck Traffic on the California State Highway System Compiled by Caltrans Traffic and Vehicle Data Systems, no date)* See Figures 1-3 and 1-4 for photographs at intersections.

Existing conditions lead to a slowing of Route 101 traffic and an increased potential for collisions. Some improvement can be expected by extending the existing acceleration and deceleration lanes and turn pockets. Closure of the Route 101 median opening at Cole Avenue and improvement of the acceleration and deceleration lanes at Airport Road were completed in 2003. These changes improved the operation and safety of Route 101 at this location.

Higher future traffic volumes on the corridor would substantially reduce the number of suitable gaps in traffic that allow left turns across opposing traffic lanes. It should also be noted that the post World War II "baby boom" generation, the largest segment of the U.S. population, will become elderly over the next 10 to 20 years. As humans age, there is a marked decrease in their ability to accurately judge and choose an adequate gap in oncoming traffic, as when crossing or turning left on or off Route 101. Older drivers are involved in a disproportionate number of collisions when there is a higher demand on driving skills, such as making left turns across traffic, merging with high-speed traffic, crossing a high-volume intersection or stopping quickly for queued traffic (AASHTO, 2004).
For safety reasons, it is important to plan and design highways to accommodate for the inevitable scenario of the elderly population comprising a much higher proportion of drivers.

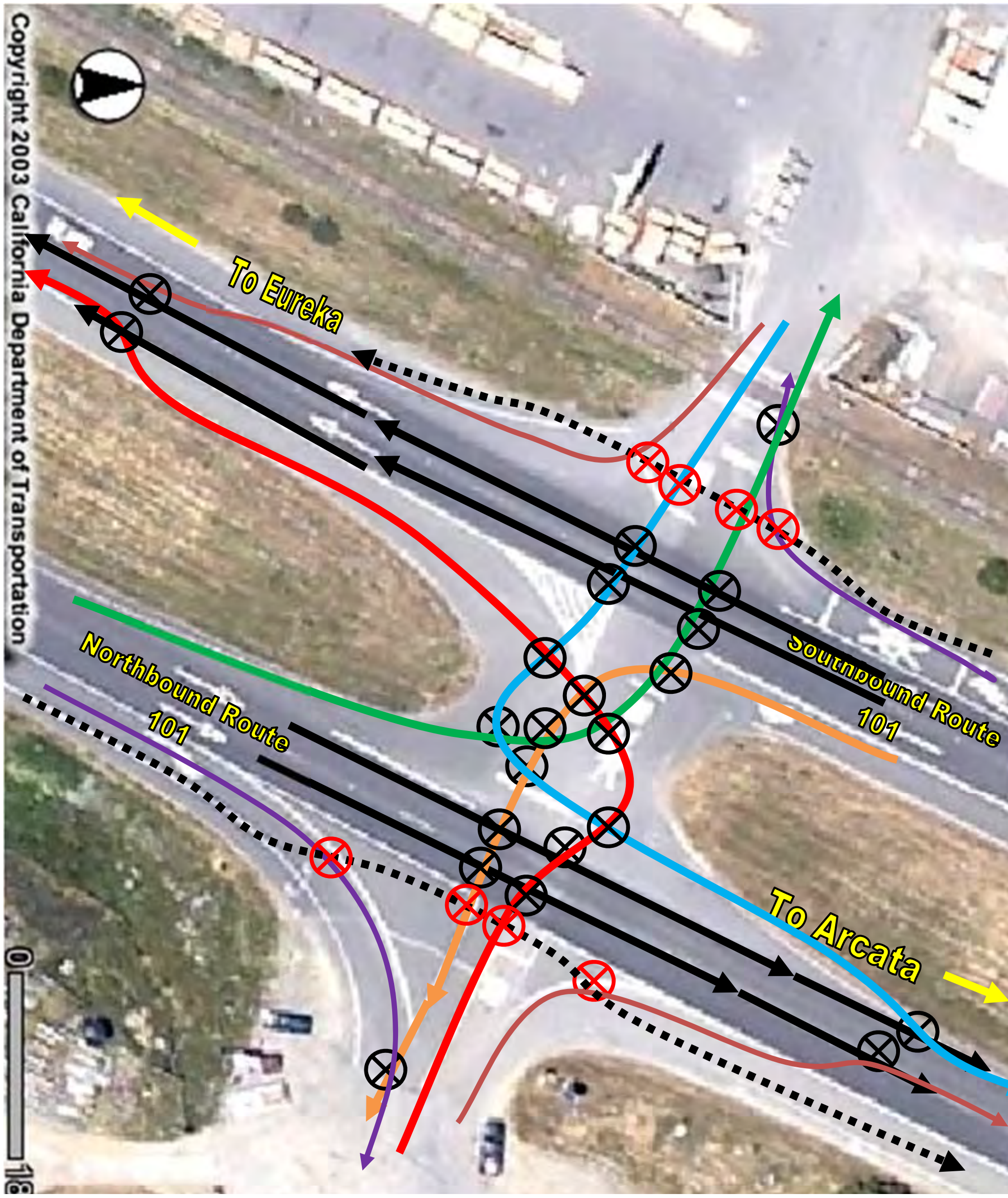


Figure 1-3 Existing Route 101 / Bracut Intersection

This aerial photograph of the existing Route 101 intersection at Bracut depicts possible vehicle turning paths (colored lines) and paths of Route 101 through traffic (black lines). The dashed lines (▪▪▪▪▪) indicate typical travel paths of bicyclists on Route 101. Potential conflicting vehicle locations can occur where the path lines cross. The ⊗ symbol indicates potential vehicle conflict locations and the ⊗ symbol indicates potential vehicle conflicts with bicyclists. This figure does not show all possible vehicle movements such as crossing or U-turn movements. The proposed project would eliminate uncontrolled (non-signalized) left turn, crossing, and U-turn movements on Route 101 between Eureka and Arcata. This would reduce the number of circled conflict points from 30 to 8 at this location.

Figure 1-4 Photograph of conflicting vehicle paths

At Route 101/Mid-City Motor World Intersection facing Humboldt Bay.
One vehicle is waiting to turn left at stop sign and in the background another vehicle is stopped in the median; both drivers are waiting for a suitable traffic gap to cross two lanes of northbound Route 101 traffic.

Project Need: Level of Service (LOS) Justification

Improving the Level of Service (LOS) is needed to reduce delays at Route 101 intersections. There is no substantial delay or capacity problem along the mainline (Route 101 through lanes) in the Eureka-Arcata Corridor; however, substantial delays associated with left turn traffic crossing Route 101 currently exist and are expected to deteriorate further if no change is made. See Figure 1-5 which is a photograph of a line of vehicles waiting to turn left from Route 101 southbound to eastbound Indianola Cutoff.

Reducing traffic congestion and implementing improvements at the at-grade intersections to improve Route 101 circulation are goals of both the Humboldt County Association of Governments (HCAOG) and Caltrans. HCAOG is a joint powers agency comprised of the seven incorporated cities (Arcata, Blue Lake, Eureka, Ferndale, Fortuna, Rio Dell, and Trinidad), and the County of Humboldt. The agency is largely responsible for funding and programming State highway public transportation improvements in the region.

LOS is a qualitative measure for describing operational conditions within a traffic stream or at an intersection. LOS is designated by a letter from “A” to “F”, with “A” representing the least delay or congestion and “F” representing the greatest delay or most severe congestion. LOS is defined differently for mainline than it is for intersections (both non-signalized and signalized). The preferred LOS mainline is “D” or better for the Route 101 segment between Eureka and Arcata (*Source: Caltrans Transportation Concept Report - Route 101 Corridor. District 1. October 2002)*

The LOS for left turns onto Route 101 from local streets and driveways is currently LOS "F" and other turn movements are expected to degrade at every location and direction by year 2041. (See Chapter 3, Section 3.1.6—Traffic and Transportation for more information.) Degradation of intersection LOS indicates vehicles queuing, which is the result of fewer opportunities to cross high traffic volumes on Route 101. This, in turn, increases the likelihood of more frequent and more serious collisions.

Figure 1-5 Vehicles queuing up in left turn lane waiting to turn left from Route 101 southbound to eastbound Indianola Cutoff

Throughout this document, year 2041 is used as a planning horizon to predict conditions that would result compared to baseline conditions in order to characterize change. In addition, the Caltrans Highway Design Manual mandates a 20-year design life for roadway improvements.

Project Need: Route 101 Roadway Maintenance and Highway Standards

The Route 101 roadway requires various rehabilitation improvements to address long-term maintenance issues and to improve the roadway to meet current highway design standards where feasible:

- The existing southbound Jacoby Creek bridge was originally constructed in 1920 and widened in 1956. Because of age, deterioration, the need for more frequent and costly maintenance, and substandard width, this bridge needs to be replaced.

- The existing northbound Jacoby Creek and Gannon Slough bridges have non-standard bridge rails that need to be replaced.

- Currently there are fixed objects (such as trees and billboards) near the vehicle traveled way of Route 101. Fixed objects too close to the edge of the traveled way can pose potential hazards for errant vehicles or vehicles making emergency maneuvers. These fixed objects within 30 feet from the edge of the traveled way, known as the clear recovery zone, would be individually considered for removal or shielded with guardrail to enhance safety.

- Tide gates were installed in 1954 at ditches adjacent to Route 101 to minimize tidal flooding from extreme high tides. They are currently in poor condition and have required repair with increasing frequency. For these reasons, nine of the existing tide gates between Eureka and Arcata have been identified for replacement.

- The existing acceleration/deceleration lanes within the project limits do not meet current traffic design standards.

Project Purpose

Background

The proposed Corridor Improvement Project consists of various improvements on Route 101 in Humboldt County between the cities of Eureka and Arcata. More specifically, the project extends from the north end of the Eureka Slough bridge (post mile 79.9) north to the 11th Street overcrossing in Arcata (post mile 86.3). Modified Alternative 3A (identified as the Preferred Alternative) would include closing roadway median crossings, constructing a grade separation at Indianola Cutoff, replacing the southbound Jacoby Creek bridge, and constructing a half signal at the Route 101/Airport Road intersection.

The California Department of Transportation (Caltrans) and the Federal Highway Administration (FHWA) developed the project need and purpose statement in consultation with the U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, and the National Oceanic and Atmospheric Administration - Fisheries during the NEPA/404-Integration process, and with representatives from the County of Humboldt and the cities of Eureka and Arcata. See Appendix E for more information regarding the NEPA/404 process.

The need and purpose for the Eureka-Arcata Corridor Improvement project was defined for listing in both the 2006 State Transportation Improvement Program (STIP) for environmental and design work only and the 2006 State Highway Operations and Protection Program (SHOPP). HCAOG, as the regional agency, funded the safety improvement portion of the project in the STIP. Caltrans funded the roadway rehabilitation portion of this project as part of the SHOPP. Subsequent project funding and programming updates are discussed later in this chapter. Modified Alternative 3A, the identified Preferred Alternative, would cost approximately $58 million. Funding from both programs requires approval by the California Transportation Commission (CTC).

The specific Corridor Improvement Project purpose consists of the following:

Improve safety at intersections. The primary purpose of the Corridor Improvement Project consists of improving traffic safety by eliminating potential traffic conflicts to reduce the number and severity of collisions. A “traffic conflict” or “operational conflict” occurs when two or more vehicles are traveling on paths that intersect, such as when vehicles in different lanes attempt to simultaneously merge into the same location or in situations in which one or more vehicles turn left across lanes of opposing traffic without adequate space. Within the Route 101 Corridor, potential traffic conflicts exist because left turns across Route 101 are presently allowed. The potential for collisions occurs when vehicles turn left across Route 101, starting from either a crossroad or from Route 101. This increased potential for collisions exists on the Corridor because six of the seven at-grade (same plane) intersections between Eureka and Arcata currently allow left turn and crossing movements. (The Route 101/Cole Avenue median crossing was closed.)

Reduce traffic delay. The proposed project would reduce traffic delays at intersections along the Route 101 corridor, which would provide and maintain a LOS “D” or better along the through travel lanes on Route 101 between Eureka and Arcata through the year 2041.

Restore and rehabilitate the roadway. A secondary project purpose is to upgrade the roadway facilities to current design standards. Pursuant to Caltrans design recommendations for rehabilitation projects, the purpose of roadway rehabilitation projects is to preserve and extend the service life of existing highways and to enhance highway safety.

Bridge structures are typically designed for a life of 75 years. *(Source: American Association of State Highway and Transportation Officials (AASHTO)* Load Resistance Factor Design (LRFD)

Bridge Specifications (2012) define "service life" as the period of time that the bridge is expected to be in operation. (AASHTO specifies 75 years as the theoretical design life.) The northbound Jacoby Creek and Gannon Slough bridges for this project are currently about 65 years old and do not need to be replaced at this time, as indicated by recent bridge inspections. However, as design standards have changed over the years, rehabilitation projects reflect those changes. In this case, bridge rail standards have changed, therefore bridge rails would be replaced on the northbound bridges to meet current safety standards. The southbound Jacoby Creek bridge is approximately 95 years old, does not meet current standards, and its structural elements are deteriorating, indicating the end of its useful life. Therefore, it is necessary to replace the bridge.

These improvements would satisfy longstanding priorities of Caltrans. The need for the project is expected to increase over time as traffic volumes along the corridor increase.

None of the proposed alternatives include constructing new through-traffic lanes to create additional traffic-carrying capacity of Route 101.

1.3 Project Background

Route 101 is often referred to as the “lifeline of the North Coast” since it is the most important interregional highway on the northern California coast. Route 101 connects the Santa Rosa/San Francisco metropolitan areas to the south and the State of Oregon to the north. Route 101 functions as the principle route to many North Coast recreational areas, including state and national parks, rivers, and beaches.

Although the Route 101 segment between Eureka and Arcata extends through a predominately rural setting, it is the most heavily traveled roadway in Humboldt County. The combined population of the cities of Arcata and Eureka is approximately 45,000. However, the population that potentially uses the corridor most frequently (the unincorporated areas near Eureka, Arcata and McKinleyville, and the cities of Eureka and Arcata) is about 90,000. Most of Humboldt County’s growth is occurring in and around cities and communities along the Route 101 corridor between Fortuna, 20 miles south of Eureka, and McKinleyville, 15 miles to the north.

Route 101 is heavily used for the transportation of intercity/interstate commerce. Commercial trucks comprise approximately 4.6 percent to 6.7 percent of the total traffic on Route 101. *(Source: 2010 Annual Average Daily Truck Traffic on the California State Highway System Compiled by Caltrans Traffic and Vehicle Data Systems, no date)* Trucks access several businesses within the corridor, as well as traveling to and from destinations beyond the corridor.

The Eureka-Arcata Corridor currently accommodates a number of different transportation modes. Murray Field, a public airport north of the businesses on Jacobs Avenue, is adjacent to Route 101 within the corridor. The airport currently accommodates approximately 100 aircraft. It does not accommodate major commercial passenger airline flights. Redwood Transit System provides commuter bus service along the corridor between Eureka and

Arcata, as well as destinations further south and north. However, there are no bus stops on Route 101 within the project limits.

Paratransit is a form of transportation service that is more flexible and personalized than conventional public transit, fixed route or fixed schedule. Service is adjusted to individual needs. Dial-a-Ride is an example of Paratransit. Dial-A-Ride services were established in January 1979 as an experimental system to determine the needs of elderly and handicapped people who could not use the existing public transportation system. Dial-A-Ride/Dial-A-Lift service provides complimentary paratransit service to passengers certified under the Americans with Disabilities Act (ADA). In addition, it provides service to people over the age of 72 regardless of their medical condition. Dial-A-Lift is designed to serve wheelchair passengers. The City of Arcata and the City of Eureka contract their paratransit service to a private taxi company based in Eureka.

Bicycle use in the corridor is moderate (see bicyclist count data in Section 3.1.6 Traffic and Transportation in Chapter 3), but strong interest has been expressed in developing a separate bicycle path adjacent to the corridor. Proponents predict that more commuter and recreational bicyclists would use the corridor if they could avoid riding on the highway shoulder, adjacent to high-speed vehicular traffic. (See Chapter 3, Section 3.16—Traffic and Transportation for additional bicycle related information.)

Humboldt Bay, which includes Arcata Bay, is regionally important for recreational and commercial boating. Portions of Humboldt Bay were recently deepened to allow large ships, including cruise ships, to enter the bay. Humboldt Bay is the only harbor for major shipping between San Francisco, California and Coos Bay, Oregon. Commercial marine transportation includes deep-draft shipping, barge traffic, and commercial fishing boats. There are several commercial ship docks and shipping-related facilities on the bay**.** Since the railroad has not been used for shipping for many years and has an uncertain future, Routes 101, 255, and 299 are the only major highways that serve as transportation links to the Humboldt Bay region.

The Northwestern Pacific Railroad is adjacent to, and west of, Route 101 between Eureka and Arcata. This railway segment has experienced limited to no use in recent years since much of the line has been inoperative because of infrastructure damage. Historically, this has been primarily a freight line, although there has been interest in developing an excursion route for tourism between the communities of Samoa and the city of Eureka.

Route 101 between Eureka and Arcata is currently a four-lane (two lanes in each direction) expressway between Eureka Slough bridge and Gannon Slough bridge with a posted 50 mph speed limit. (An "expressway" is a high-speed divided highway for through traffic with access partially controlled. A "controlled access" facility is a roadway where the spacing and design of driveways, medians, median openings, traffic signals and intersections are strictly regulated by consideration of such factors as traffic volume and number of lanes, which gives preference to through traffic.) Vehicle headlights are currently required to be on 24 hours a day in this segment of the corridor to enhance visibility.

Interim Solution: The Safety Corridor

In May 2002, Caltrans implemented a Safety Corridor as a temporary measure to reduce intersection collision rates within the Route 101 expressway portion of the project limits between the Eureka Slough and Gannon Slough bridges until long-term project improvements could be constructed. Caltrans initially developed several interim strategies that could be readily implemented. Two public open houses were held in October 2001 to solicit feedback from business owners in the corridor and the public regarding these potential interim strategies. Caltrans, in cooperation with HCAOG and state and local law enforcement agencies, selected the Safety Corridor as an interim solution consisting of what were referred to as the three E's: Engineering components, Education, and Enforcement. A breakdown of these elements is as follows:

Engineering Components

- Signs alerting motorists of speed reduction ahead (reducing speed limit from 60 mph to 50 mph);
- Radar-activated speed feedback signs, mounted with fixed speed limit signs, indicating motorist speeds;
- Vehicle headlights to be on 24 hours a day within the Safety Corridor; and
- Retrofitting existing stop signs with flashing red lights to further warn travelers on side street approaches of high speed cross traffic on Route 101.

Education and Enforcement Components

- Grant funding for educating the public by print, radio, television, and community events on the need for compliance with the elements of the Safety Corridor was obtained along with grant funding for additional/enhanced enforcement of speed and headlight use within the Safety Corridor. This grant was obtained from the Office of Traffic Safety and the funding expired after the first year of operation (May 2002 through May 2003). While grants for additional funding to extend the enhanced enforcement and education components have been considered, none have been obtained, and there is no other source of funding for these components.
- The passage of State Senate Bill 1349 created the "Highways Safety Enhancement Double Fine Zone," which, when started in January 2003, doubled the fine for speeding violations within the Eureka-Arcata Corridor and further reinforced the elements of the Safety Corridor. This Senate Bill expired on January 1, 2006 ending the double fine zone.

During the Safety corridor's first year of operation, there were 45 percent fewer collisions overall; at the intersections, there were 80 percent fewer collisions. The percentage changes were based on the first year collision data compared to the five-year period prior to the Safety Corridor, which was averaged between January 1, 1996 to December 31, 2000. *(Source: Eureka-Arcata Safety Corridor, 1st Annual Report. Caltrans District 1 Traffic Safety. June 18, 2003)* However, even with a Safety Corridor in place for over ten years, collision rates above statewide averages occur at two of the intersections. Even though the Safety Corridor enhanced safety overall, the possibility of severe collisions from left turn movements at intersections remains. At public meetings, the Safety Corridor has been described to the public as an interim, not permanent, project. See the previous discussion under the subheading *Project Need: Reduce Collisions* for more information.

Moreover, a review of Safety Corridors on other highways within the State has shown that their effectiveness is short-lived. Among the explanations for this loss of effectiveness given by traffic safety engineers is the phenomenon of driver habituation or complacency after frequent driving of the Safety Corridors. In other words, warning signs, which rely upon driver alertness and attentiveness, are not long-term effective substitutes for permanent roadway improvements. After an initial enhanced enforcement period (ranging from one to three years), the collision rates in these 29 Safety Corridors approached the pre-safety corridor implementation collision rates. Despite the Safety Corridor, traffic volumes are predicted to increase over time resulting in increased traffic collisions even if the reduced speed limit remains in effect. (See Chapter 3, Section 3.1.6 – Traffic and Transportation for more information.)

After the implementation of the Safety Corridor, Route 255 and Old Arcata Road have experienced increases in collision rates. Route 255 has also experienced an approximate 30 percent increase in traffic volume.

State, Interregional, Regional, and Local Transportation Planning

The Eureka-Arcata Route 101 Corridor Improvement project has been approved for funding through the State Transportation Improvement Program (STIP). The STIP is made up of two components: The Interregional Transportation Improvement Program (ITIP) component (25 percent), which is available to the state; and the Regional Transportation Improvement Program (RTIP) component (75 percent), which is available to Regional Transportation Planning Agencies, such as the Humboldt County Association of Governments (HCAOG). HCAOG is largely responsible for programming/funding State highway, local street improvements, and public transportation resources.

The purpose of the STIP is to allow future allocations of certain state transportation funds for state highway improvements, intercity rail, and regional highway and transit improvements. It is a biennial document that covers a five-year period and adds two years of funding capacity each cycle.

The Eureka-Arcata Route 101 Corridor Improvement project is listed as a Tier I project in the 2016 STIP. Tier 1 projects represent intent for new ITIP funding in the next STIP.

The Regional Transportation Plan, or RTP, is a long-range planning document prepared by HCAOG. It provides a course for future transportation investment in the region, with the objective of building and maintaining a multi-modal, safe and efficient, balanced transportation system, which also balances moving goods and people with sustaining non-renewable resources. The RTP addresses transportation system preservation as well as projected growth and congestion over the next 20 years, so that transportation improvements can be tied to need and purpose. The RTP identifies regional transportation improvements to serve as a foundation for the development of the Regional Transportation Improvement Program (RTIP).

HCAOG adopted the last RTP in 2015. The RTP Update 2016 helps chart the course to provide Variety in Rural Options of Mobility consisting of: Complete Streets (covering roadway, pedestrian, and bicycle systems), Trails (commuter), Tribal Transportation, Public Transportation, Aviation, Goods Movement, Emergency Transportation, and Finance. This update reflects changes in legislative requirements, local land use policies, and resource constraints.

The Eureka-Arcata Route 101 Corridor Improvement Project is included in the RTP, which is a requirement to qualify for STIP funding, and in the 2016 RTP update. The Project has been a longstanding HCAOG priority because traffic collisions that have occurred at intersections along the corridor have often resulted in serious injuries or death and substantial property damage. The HCAOG Regional Transportation Improvement Plan included a policy requesting that Caltrans construct grade separations on expressway portions of Route 101.

In early 2006, a project to resurface, restore, and rehabilitate (RRR) the Eureka – Arcata Route 101 corridor was combined with the Eureka – Arcata Route 101 corridor STIP-funded safety improvement project previously discussed. (See Chapter 2, Section 2.2 for a complete project description.) The major elements of the RRR work include extending or constructing acceleration and deceleration lanes, replacing southbound Jacoby Creek bridge, and replacing the bridge rail on the northbound Jacoby Creek and Gannon Slough bridges. This major maintenance work is needed to bring the roadway facility up to current design standards as well as extend the serviceable life of the existing roadway.

Caltrans programmed and funded the roadway rehabilitation portion of this project as part of the State Highway Operations and Protection Program (SHOPP)[6], which is separate from the STIP. Funding from both programs requires a vote of approval from the California Transportation Commission (CTC).

Currently, the Eureka-Arcata Corridor Improvement project is programmed in the 2016 STIP, both in the Regional Improvement program (RIP) and the Interregional Improvement Program (IP).

Modified Alternative 3A, the Preferred Alternative identified in Chapter 2, has an estimated year 2016 cost of $58 million, including right-of-way costs. The RRR work was programmed in the 2008 SHOPP for $34.7 million, with the remainder of the work proposed to be funded through the STIP program.

In June 2011, funding for the SHOPP RRR project portion was reallocated. Most, if not all, of the original components of the SHOPP funded RRR project are expected to be separately programmed, funded, designed, and constructed in future SHOPP cycles.

Even though project elements have been separated, the Final EIR/S provides environmental documentation for all of the STIP and SHOPP project components. Any project components constructed prior to Final EIR/S approval had separate environmental documents to evaluate potential project impacts. All project components were evaluated both individually and collectively as one project in the Final EIR/S and potential cumulative impacts were evaluated.

Project Study Report (PSR) and Supplemental PSR

Caltrans, in coordination with the cities of Eureka and Arcata, as well as the County of Humboldt, prepared a Project Study Report (PSR), approved May 1, 2000, which identified the need for a project on Route 101 between Eureka and Arcata to improve safety and traffic operations and reduce delay at intersections. The PSR included initial project design and environmental document cost estimates for the year 2000 STIP as a Regional Improvement project.

At the request of HCAOG, Caltrans prepared a Supplemental PSR and approved it on September 14, 2000. The Supplemental PSR excluded alternatives with frontage roads because frontage road construction would result in extensive impacts to wetlands and wildlife refuges, and funding to support high mitigation costs would be unlikely.

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[6] The department (Caltrans) shall prepare a state highway operation and protection program for the expenditure of transportation funds for major capital improvements that are necessary to preserve and protect the state highway system. Projects included in the program shall be limited to capital improvements relative to maintenance, safety, and rehabilitation of state highways and bridges which do not add a new traffic lane to the system. *Source: California Government Code section 14526.5, amended in 1992 by Chapter 1177 (SB 1435)*

Two alternatives were carried forward to the project design and planning process. (For more information regarding the PSR process, see Chapter 2.)

Value Analysis Study Report

After completion of the PSR and Supplemental PSR, Caltrans completed a Value Analysis Study Report in February 2002. The Value Analysis (VA) team which prepared the report included Caltrans representatives as well as representatives from various public agencies and organizations. The report included an analysis of alternatives proposed in the PSR and supplemental PSR, developed possible viable alternatives, built consensus and resolved issues with project stakeholders and transportation partners, examined reducing project costs as well as reducing life cycle costs, and validated the project need and purpose. For more information regarding the Value Analysis process, refer to Chapter 2, Section 2.2 - Alternatives Development Process.

Route 101 Roadway Resurface, Restore, and Rehabilitate (RRR) Project

Prior to the initiation of the Route 101 corridor improvement project to improve safety, Caltrans prepared and approved a Project Scope Summary Report in 1999 to initiate a project to resurface, restore, and rehabilitate (RRR) the Route 101 roadway between Eureka and Arcata.

Second Value Analysis Study Report

A second Value Analysis study was performed in July of 2005 to develop and evaluate alternatives for the proposed RRR project. The VA team (excluding the team facilitators) comprised Caltrans staff from various functional units. The VA team identified 18 alternatives or project modifications that could potentially improve performance of the project or reduce project costs. Of these alternatives, four were combined and accepted by the VA team. The VA Alternative included minor cost adjustments for eliminating some reset barrier work, weed barrier under guardrails, and strengthening of guardrails to reduce the number of eucalyptus trees that would otherwise need to be removed. The substantial cost savings improvement suggested realigning the northbound Route 101 lanes toward the median to accommodate acceleration and deceleration lanes at Cole Avenue. This eliminated the need to construct retaining walls along Jacobs Avenue and minimized fill placement, thus reducing wetland and drainage impacts. Another VA Alternative was accepted to add guardrail around two or three existing billboards in lieu of the higher expense of purchasing the ongoing leases from the advertising owners and the North Coast Railroad Authority to pay for future advertising income. Ultimately, the proposed RRR project was modified to incorporate some of the final VA recommendations.

In early 2006, during the planning phase, Caltrans, with HCAOG approval, decided to shorten the RRR rehabilitation project work limits and combine the project with the safety improvement project (creating one major project). All Build Alternatives evaluated in this Final EIR/S include roadway resurfacing, restoration, and rehabilitation work.

Capital Preventative Maintenance (CAPM) Project

After circulation of the Draft EIR/S, the roadway resurfacing portion of the project was removed from this Project and completed as a separate individual project. The Capital Preventative Maintenance (CAPM) pavement overlay portion of the project (01-3633U) was completed in 2014, and was Categorically Excluded from NEPA review, and Categorically Exempt from CEQA review in 2012. This action did not change the purpose and need of the overall Project, or restrict consideration of any alternatives discussed in this document. These pavement overlay maintenance projects occur regularly

Project Independent Utility and Logical Termini

FHWA regulations (23 CFR 771.111 [f]) require that the project alternatives include an evaluation of the following:

1. Connect logical termini and be of sufficient length to address environmental matters on a broad scope. Logical project termini are defined as (1) rational end points for a transportation improvement, and (2) rational end points for an adequate review of potential environmental impacts. Therefore, related improvements within a transportation facility should be evaluated as one project, rather than selecting termini based on what is programmed as short-range improvements.

2. Have independent utility or independent significance (be usable and require a reasonable expenditure even if no additional transportation improvements in the area are made). In other words, a project possesses independent utility if it is a stand-alone project and reasonable expenditure even if no additional transportation improvements in the area are made.

3. Not restrict consideration of alternatives for other reasonably foreseeable transportation improvements.

Caltrans coordinated with the FHWA to set both the project construction limits as well as the project study limits to ensure both logical termini and independent utility. The following are factors justifying setting the project construction and environmental study limits (logical termini):

- The south project construction limit would begin north of the Eureka Slough bridge, which is the northern urban core boundary of Eureka. The Route 101/255 intersection in Eureka was set as the southern study limit since at this location the three north-south roads between Eureka and Arcata intersect: the three north-south roads are Route 101, R Street/State Route 255, and Myrtle Avenue (becomes Old Arcata Road).

- The northernmost project construction element is the proposed replacement of tide gates north of the Gannon Slough bridge. The study limit is the Route 101/255 interchange in Arcata. The 101/255 interchange is also the approximate southern boundary of the Arcata urban core. State Route 255 serves the Manila area and connects to Old Arcata Road. State Route 255 makes a transition to Old Arcata Road, which connects to Eureka.
- The land use within the construction limits is primarily non-urban.
- The average daily traffic within the project limits is among the highest for any highway within Humboldt County since this segment of Route 101 links the two largest cities in the county. In addition, Eureka is a major destination for shopping, public/government services, schools, and jobs.
- All proposed improvements are compatible and would be efficient to construct as one project.
- By grouping the improvements, potential project impacts can be evaluated individually as well as cumulatively.
- Except for tide gate replacement, all of the improvements within the project limits would collectively improve both traffic safety and operation.

Most of the environmental studies extend beyond the project construction limits. For example, the traffic study includes State Route 255 and Old Arcata Road; both of these highways also link Eureka and Arcata, which could be potentially affected by the proposed project.

Regarding independent utility, the proposed project could be constructed independently—in other words, each project element is not dependent on other project elements or improvements. Once all the project improvements described in this document are constructed, no further improvements would be required. Value Analysis and preliminary project studies (described previously in this chapter) were prepared to study a variety of alternatives to construct a cost effective and feasible project that would meet the project purposed and need. Thus, when the CAPM overlay portion was constructed in 2014, it is not considered piece-mealing of the project under NEPA.

Finally, the project would not restrict consideration of alternatives for other reasonably foreseeable transportation improvements. As described previously in this chapter, the proposed project was planned, evaluated, and programmed through state, interregional, regional, and local transportation planning processes. In addition, Caltrans has coordinated with other agencies and non-profit organizations to ensure the proposed project would not conflict with any planned or foreseeable public transit and non-motorized transit (e.g., bicycle trail) projects.

Summary of Project Process to Date

NEPA/404 Integration Process

The project Need and Purpose Statement presented in this chapter was refined through a collaborative process among federal agencies as outlined in the NEPA/404 Integration Memorandum of Understanding (MOU). The MOU sets out a consultation process among designated federal agencies resulting in written concurrence in the project Need and Purpose Statement. Signatories to this project Need and Purpose Statement are FHWA, U.S. Fish and Wildlife Service, the U.S. Army Corps of Engineers, National Oceanic and Atmospheric Administration – Fisheries, and U.S. Environmental Protection Agency. See Appendix E for more information regarding the NEPA/404 process.

NEPA Re-evaluation/re-validation

A comprehensive re-evaluation/re-validation of environmental studies was undertaken in 2012 and 2016 to determine if the findings remain valid and if the project work scope changed substantially. The outcome of these re-evaluation/re-validations was that the studies remain valid and the project scope changes do not result in new environmental impacts. The Final EIR/S includes minor study updates and changes in the project scope. The re-evaluation/re-validation was documented in a form approved by the FHWA on March 29, 2012, and November 22, 2016. The 2016 re-evaluation concluded that under CFR 771.130(b)(1) the project does not require circulation of a Supplemental EIR.

Chapter 2 Project Alternatives

2.1 Project Description

This section describes the proposed project and the design alternatives that were developed by an interdisciplinary team to achieve the project need and purpose while avoiding or minimizing environmental impacts. The Build Alternatives consist of Alternatives 1, 1A, 2, 3, and Modified Alternative 3A. Modified Alternative 3A is the Preferred Alternative identified in this document. Each Build Alternative would consist of improvements to Route 101 between the Eureka Slough bridge in Eureka and the 11th Street overcrossing in Arcata, (post miles 79.9 to 86.3) in Humboldt County. See Figures S-1, 2, and 3 for Project Location Maps and Figure S-4 in the Summary section of this document for an overview of Build Alternatives. The proposed project would improve safety and reduce operational conflicts and traffic delays at Route 101 intersections between Eureka and Arcata by:

- Eliminating left turn traffic movements/conflicts
- Extending or constructing right-turn acceleration and deceleration lanes

For Modified Alternative 3A, the identified Preferred Alternative, major project features also include constructing a Route 101/Indianola Cutoff grade separation, realigning and signalizing Airport Road at Route 101, constructing an additional lane from the existing Cole Avenue acceleration lane to the Mid-City Motor World entrance, and replacing the southbound Jacoby Creek bridge.

NOTE: As described in the project description in the Draft EIR/S, the proposed project comprises two primary components with each funded and programmed separately:

1. Traffic safety enhancement and traffic operations improvements under the State Transportation Improvement Program (STIP). This work includes the proposed grade separation at Indianola Cutoff, the Airport Road signal, and Route 101 median closures. The STIP funded project components cannot be separated and must be constructed together.

2. Major roadway maintenance improvements under the State Highway Operation and Protection Program (SHOPP) for major maintenance improvements such as replacing the southbound Jacoby Creek bridge and paving. The various SHOPP components are functionally independent and can be constructed separately.

Since the circulation of the Draft EIR/S, the SHOPP portion of the project has been split out from the STIP improvements; the SHOPP components will in turn become separate projects. These various components of the project are currently being analyzed under this one NEPA/CEQA document as one whole project. Future actions such as permitting and construction may occur together or as separate projects. For example, the Capital Preventative Maintenance (CAPM) pavement overlay portion of the project (01-3633U) was separated out and completed in 2014, and was Categorically Excluded from NEPA review, and Categorically Exempt from CEQA review in 2012.

Currently the project is split into these five separate funding components:

01-36600	Indianola Interchange and Airport Road signal, STIP Funded portion
01-0E000	Jacoby Creek bridge, bridge rails and guardrails near bridges
01-0C970	Upgrade guardrails, replace and add median barriers
01-0F220	Extend acceleration lanes, realign southbound lanes at California Redwood Company, reconstruct ramps at Route 255 interchange, upgrade lighting
01-0C930	Replace tide gates and add rock weir in Gannon Slough

Even though the project components have been split up, the Final EIR/S provides environmental documentation for all STIP and SHOPP project components. These components were evaluated both individually and collectively as one project in the Final EIR/S.

The No-Build Alternative is included in this document for comparison purposes. This Alternative retains the current roadway alignment and access, including median openings. The No-Build Alternative would propose no modifications to the existing alignment or access for this project. The existing daytime headlight and reduced speed signs would remain. Other projects to maintain/rehabilitate the road surfaces, drainage improvements, bridge retrofit or widening projects, or other safety-related projects would continue on a case-by-case basis. The No-Build Alternative does not satisfy the need and purpose for the project.

2.2 Alternatives

Development Process

This section describes how alternatives were developed for consideration for the proposed Route 101 Corridor Improvement Project from the Eureka Slough bridge to the 11th Street overcrossing in Arcata (post miles 79.9 to 86.3). This section also describes in detail the five Build Alternatives that are evaluated in this Final Environmental Impact Report/Study. Finally, this section describes project alternatives that were initially considered but withdrawn from consideration and the reasons for their withdrawal.

Project Study Report and Supplemental Project Study Report

As described in Chapter 1, Route 101 corridor improvements between Eureka and Arcata have been a long-standing priority of the Humboldt County Association of Governments (HCAOG). In response to HCAOG, Caltrans developed a Project Study Report (PSR), which documented the existing and projected need for the project and began the alternative development process for a project that would improve safety and highway operations within the Route 101 corridor. In May 2000, Caltrans approved the PSR, which identified the need for a project on Route 101 between Eureka and Arcata to improve safety at intersections, reduce operational conflicts along the corridor, and reduce delays at intersections. The Project Study Report included initial project design and environmental document cost estimates. The project limits for these safety improvements extends from Eureka Slough bridge (post mile 79.9) in the south to the Bayside Cutoff (post mile 84.4) to the north.

The initial PSR evaluated nine alternatives and identified four that met the project need and purpose:

- **X1 Alternative** – Conversion to four lane freeway, with a grade separation at Indianola Cutoff, frontage roads, closure of all median openings, and a new bridge from 6th Street to Jacobs Avenue over the Eureka Slough. The approximate cost was estimated to be $132,000,000 in year 2000 dollars.

- **X5 Alternative** – Similar to X1, except that the Route 101 roadway would be an elevated structure from Mid-City Motor World to Bracut, so the frontage road could be located under the structure. The approximate cost was estimated to be $305,000,000 in year 2000 dollars.

- **Y3 Alternative** – Improve right-turn acceleration/deceleration lanes, close all median openings, and widen shoulders. The approximate cost was estimated to be $18,000,000 in year 2000 dollars.

- **Y4 Alternative** – Similar to Y3, but included a grade separation (interchange) at Indianola Cutoff. The approximate cost was estimated to be $31,000,000 in year 2000 dollars.

The results of these efforts were shared with the community in public workshops.

In September 2000, Caltrans prepared a Supplemental Project Study Report at the request of HCAOG. The Supplemental PSR further reduced the range of alternatives to be studied due to predicted extensive environmental impacts and the likely unavailability of funding to support the large construction and mitigation costs of certain alternatives. On these grounds, alternatives proposed for full upgrade to freeway (i.e., with frontage roads) were eliminated; therefore, the range of Build Alternatives was narrowed to two:

1. Alternative Y3 proposed closing all the median openings and extending the acceleration and deceleration lanes at existing intersections for right-turn only movements. This alternative would not include a grade separation, additional Eureka Slough crossing, or frontage roads. This alternative eventually evolved to become Alternative 1 in this Final Environmental Impact Report/Statement.

2. Alternative Y4 included the above project elements with a compact diamond grade separation at Indianola Cutoff. This alternative eventually evolved to become Alternative 2 in this Final EIR/S.

Value Analysis Process

Due in part to community comments obtained during project scoping, and requirements set by FHWA, Caltrans embarked on an effort to further explore possible alternatives that would resolve the safety concerns that had been identified. This effort, known as Value Analysis, involved the participation of members from the City of Eureka, County of Humboldt, California Department of Fish and Wildlife, and a member of the community. In addition to brainstorming and preparing alternatives, Value Analysis team members made presentations to resource and regulatory agency staff, City and County staff, and the general public. The agencies included the U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers, California Coastal Commission, National Oceanic and Atmospheric Administration - Fisheries (NOAA Fisheries), HCAOG, City of Arcata Public Works, County Planning and Public Works Departments, Eureka Police Department, California Highway Patrol, Table Bluff Reservation Rancheria, and the Federal Highway Administration. This effort was concluded in February 2002. The Value Analysis team analyzed the alternatives proposed in the PSR and Supplemental PSR, brainstormed and developed other viable alternatives, and worked towards consensus. The Value Analysis team resolved issues with project sponsors to reduce project costs and develop solutions to difficult transportation problems, and validated the project need and purpose.

The VA team then identified and agreed upon the following performance and weighting criteria to use to evaluate and rank ideas:

- Safety improvements (28% weight)
- Route 101 traffic operation (19% weight)
- Adjacent area impacts (17% weight)
- Biological impacts (17% weight)
- Environmental (archaeological, visual, air quality, energy consumption and aesthetic) impacts (12% weight)
- Route system impacts (7% weight)

The team then evaluated (using the performance criteria) over 70 ideas and weighed them against the Y4 Alternative from the PSR. The Y4 Alternative included closing median openings, constructing a grade separation at Indianola Cutoff at Route 101, improving right-turn acceleration and deceleration lanes, and widening existing shoulders. The PSR Y4 Alternative was estimated to cost approximately $31,330,000 (Year 2000 cost estimate) and meet the project need and purpose. The team then chose the best concepts from the 70 initial ideas and further developed and analyzed those. Some ideas were combined to form one alternative. The VA alternatives presented to Caltrans staff included:

- Eliminate shoulder widening from the project
- Construct Eureka-Arcata frontage road with a 6th Street bridge over Eureka Slough
- Construct Eureka to Indianola frontage road with a 6th Street bridge spanning the Eureka Slough
- Implement traffic systems management and expand public transit
- Use pace cars to create traffic gaps for turns at intersections
- Eliminate all median openings with no grade separations
- Y4 Alternative with fly-over interchange at Indianola (includes roundabout)
- Y4 Alternative with a single point grade separation (interchange)
- Y4 Alternative with a roundabout grade separation
- Y4 Alternative adding a southbound Jacobs Avenue hook ramp
- Implement mass transit that would serve all future traffic volume increases and thus maintain the existing Average Daily Traffic

The VA team and Caltrans staff concluded that the following alternatives should be evaluated further:

- *VA Alternative 5.0* - Close medians, eliminate left turn movements, and improve existing right-turn acceleration and deceleration lanes. This alternative was a refinement of the PSR Alternative Y3 with the shoulder widening eliminated.
- *VA Alternative 1.0* - Same as Alternative 5.0, but with a compact diamond grade separation at Indianola Cutoff. This alternative is similar to PSR Alternative Y4, but without shoulder widening.
- *VA Alternative 6.4* – Similar to Alternative 1.0, but with a single point grade separation design option.
- *VA Alternative 6.2* – Similar to Alternative 1.0, but with a roundabout grade separation design option.

Eventually Alternatives 5.0 and 1.0 became the bases for Alternatives 1 and 2 in this document, while Alternatives 6.4 and 6.2 were eventually dropped because they would have greater wetland impact than Alternative 1.0 and no additional operational advantages.

After the VA process concluded, a public information meeting was held on May 15, 2003 to present these two alternatives and the No-Build Alternative to the public. At that time, a group of individuals representing businesses within the Route 101 corridor designated themselves as the "101 Corridor Access Project Group" (101 CAP) and made presentations to HCAOG regarding concerns about adverse impacts to their businesses as a result of closing the medians. Consequently, HCAOG requested Caltrans evaluate alternatives that included signalization of Route 101 at Airport Road. Thus, Alternative 3 was included, which consists of the same project elements as Alternative 2 but with the addition of a signal at Airport Road.

Resurface, Restore, and Rehabilitate (RRR) Work

In early 2006, a project to resurface, restore, and rehabilitate (RRR) the Eureka-Arcata Route 101 corridor was combined with the safety improvements previously discussed. The major elements of the RRR work include extending or constructing acceleration and deceleration lanes, replacing southbound Jacoby Creek bridge, and replacing the bridge rail on the northbound Jacoby Creek and Gannon Slough bridges. This major maintenance work is needed to bring the roadway facility up to current design standards and to extend the serviceable life of the existing roadway, even with implementation of the initially proposed Route 101 corridor improvement project (described as Alternatives Y3 and Y4 earlier in this chapter). Thus, the RRR work has been added to each of the Build Alternatives. (See Chapter 2, Section 2.1 for a complete project description.)

Modified Alternatives

After the public circulation of the Draft Environmental Impact Report/Statement (DEIR/S), the County of Humboldt requested the study of an alternative with turnarounds in place of a grade separation (interchange) at Route 101 and Indianola Cutoff. As a result, Alternative 1A was designed and evaluated in this document. This alternative is similar to Alternative 1 except that it includes three median turnarounds and a Route 101 southbound left turn only signal at Airport Road.

Alternative 3A was also designed after the circulation of the DEIR/S. It is similar to Alternative 3 except that the proposed grade separation at Indianola Cutoff was redesigned to reduce the wetland impact and would completely avoid the County airport (Murray Field). This alternative included partial signalization at Route 101 and Airport Road that would allow left turns from southbound Route 101. However, HCAOG, the project sponsor, raised the concern that Alternative 3A would not accommodate left turns from Airport Road to southbound Route 101. Consequently, Caltrans modified Alternative 3A to include this move and Alternative 3A was renamed Modified Alternative 3A to indicate the inclusion of a half signal allowing left turn movements from Airport Road to Route 101.

NEPA/404 Process

The NEPA/404 Integration process, like the PSR and Value Analysis processes, requires the design and evaluation of project alternatives. Because this project would have potentially substantial permanent impacts to Waters of the U.S. (including wetlands) and requires the preparation of an Environmental Impact Statement, Caltrans is subject to the requirements of the April 2006 NEPA/404 Integration Memorandum of Understanding (NEPA/404 MOU). This MOU requires that Caltrans and the FHWA obtain formal concurrence from the following agencies on the stated need and purpose of the project, as well as the range of alternatives developed: U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service, National Oceanic and Atmospheric Administration (NOAA) Fisheries, and the U.S. Environmental Protection Agency. These agencies have provided their concurrence on the current range of alternatives. (See Appendix E for more information regarding the NEPA/404 process.)

Alternative Selection Criteria

All proposed alternatives were evaluated against conformance criteria described below to determine if the alternative meets the need and purpose for the project.

Safety Conformance Criterion: The project would reduce the number of fatal plus injury collisions at each intersection to below the existing statewide average number of fatal plus injury collisions for traffic volumes projected to year 2041.

Operational Conflicts Conformance Criterion: The project would eliminate uncontrolled left turn movements crossing Route 101 mainline (through lanes).

Level of Service (LOS) Conformance Criterion: The project would maintain a LOS "D" or better for Route 101 mainline (through lanes) and for each move at non-signalized intersections, and an overall LOS "C" or better at signalized intersections.

Rehabilitation Conformance Criterion: After the roadway rehabilitation work was combined with the safety project to close Route 101 medians, a Rehabilitation Conformance Criterion was developed to determine if alternatives met the need and purpose for the project. Rehabilitation improvements would include improvements that extend the life of the Route 101 roadway by a minimum of ten years. The projected life of the proposed roadway improvements is expected to be up to 20 years. The projected life for the proposed southbound Jacoby Creek bridge replacement is 75 years.

Evaluation Criteria

The five alternatives that meet all the Alternative Selection Criteria are discussed in detail in this environmental document. The environmental evaluation criteria that follows provides a basis to identify the least environmentally damaging practicable alternative. The environmental review process summarized in this document discusses a full range of potential environmental effects—both adverse and beneficial:

- Wetlands and other regulated waters
- Listed Threatened and Endangered Species and other sensitive biological resources
- Public wildlife refuge/management lands
- Agricultural lands
- Residences—including Environmental Justice communities (See Chapter 3, Section 3.1.4 for more information)
- Businesses
- Potential change in factors influencing development growth
- Local and regional land use planning
- Public facilities (airport, railroad, etc.)
- Scenic resources
- Coastal resources
- Traffic (includes Route 101 and alternate routes Old Arcata Road and Route 255)
- Cultural Resources (includes historic and archaeological resources)
- Hazardous waste
- Consistency with goals of the Caltrans Transportation Concept Report and Regional Transportation Plan
- Temporary impacts from noise during construction
- Water quality and flooding

Project Build Alternatives Evaluated in the Final Environmental Impact Report/Statement

Initially, 22 alternatives were discussed at various public outreach efforts and developed and analyzed during the project design and planning process. Of these, five Build Alternatives have been identified by Caltrans staff as meeting the stated need and purpose for the project and are included in this environmental document, along with the No-Build Alternative. The project limits are the same for the five alternatives and were set to be a reasonable length to best meet the need and purpose of improving traffic safety, intersection Level of Service (LOS), and extending the serviceable life of the roadway up to 20 years. Modified Alternative 3A was identified as the Preferred Alternative after the public circulation and comment period of the Draft Environmental Impact Report/Statement and public hearing. (The Preferred Alternative selection process is discussed in detail later in this chapter.)

The five Build Alternatives and the No-Build Alternative are described below. All Build Alternatives would meet the project need and purpose as described in Chapter 1. For each Build Alternative, estimated project construction costs do not include any additional right-of-way requirements for wetland mitigation because off-site wetland mitigation is currently being developed for multiple projects. See Figure S-4 for an overview of the Build Alternatives and Appendix A for detailed plans of the Build Alternatives.

Alternative 1 - Restore and Rehabilitate Roadway with Median Closures

This alternative consists of the following:

1. Extend the existing Route 101 right-side acceleration and deceleration lanes at the intersection locations listed (from south to north) in Table 2-1. After construction, the acceleration and deceleration lanes would have a minimum of 4-foot-wide shoulders.

2. Close all remaining Route 101 median crossings: Airport Road, Mid-City Motor World, California Redwood Company (formerly Simpson), Indianola Cutoff, Bracut, and Bayside Cutoff. The existing median paving would be removed.

3. Install cable median safety barrier and weed barrier between the Eureka Slough bridges and Airport Road.[7]

[7] The Draft Environmental Impact Report/Statement for this project stated concrete median barrier would be constructed at this location; subsequently, concrete median barrier has been dropped from the project scope of work.

Table 2-1 Proposed Right-Turn Acceleration and Deceleration Lane Locations		
Route 101 Intersection Name	**Location of Lanes**	**Work Description**
Cole Avenue	East side of Route 101	Extend existing deceleration lane; eliminate right turn on move to northbound Route 101. Deceleration lane shoulder would be widened to 4 feet wide. Roadway lighting would be added or upgraded to conform to current highway design standards.
Mid-City Motor World	East side of Route 101	Extend acceleration lane to 1,600 feet and extend deceleration lane to 600-feet with a 4-foot-wide shoulder.
California Redwood Company (formerly Simpson)	West side of Route 101	Extend acceleration lane 1,600-feet and extend deceleration lane 600-feet by realigning the southbound Route 101 lanes into the median. The acceleration and deceleration lanes would have 4-foot-wide shoulders.
Indianola Cutoff	East side of Route 101	Extend acceleration lane to 1,600-feet and extend deceleration lane to 600-feet; shoulders would be widened to 4 feet wide. The work description at this location only applies to Alternative 1.
Bracut	Both sides of Route 101	Extend acceleration lane to 1,600-feet and extend deceleration lane to 600-feet; shoulders would be widened to 4 feet wide. The acceleration and deceleration lane work on the west side would require a temporary construction easement. Paved improvements would remain within the existing highway right-of-way. Additional lighting would be required to conform to these improvements. Underground telephone lines would need to be relocated on the west side of Route 101.
Bayside Cutoff	East side of Route 101	Extend acceleration lane to 1,600-feet and extend deceleration lane to 600-feet; shoulders would be widened to 4 feet wide. Additional lighting would be required to conform to these improvements.

4. Replace southbound Jacoby Creek bridge. The existing bridge is over 95 years old and is structurally and functionally obsolete. The new single span bridge would be approximately 74-feet-long and 43-feet-wide (about 4 feet wider than the current bridge). The additional width would provide a barrier-separated travel way for non-motorized traffic and would include bicycle railing installed on the outside barrier. The new bridge would be two lanes wide and single span with no piers in the channel (the current bridge is a three-span structure). The new bridge would be erected to the east of the current alignment and serve as a temporary detour bridge to allow two lanes to remain open to traffic in each direction during construction.

5. Upgrade bridge rail on northbound Jacoby Creek and Gannon Slough bridges. The northbound Jacoby Creek and northbound Gannon Slough bridges[8] would maintain the existing deck or traveled way width, but would be re-striped to a 4-foot-wide left shoulder, 11-foot-wide lane, 12-foot-wide lane, and 10-foot outside shoulder to match the proposed roadway width. The bridges would be widened 18 inches to accommodate new 20-inch wide barrier rails (for a total width of 40 feet 4 inches). The bridge rail replacement would include bicycle railing installed on the outside barrier. These two bridges would be upgraded without any pile driving or in-stream work.

6. Replace nine existing tide gates within the project limits. The existing tide gates were installed in 1954 and are in poor condition requiring repair at an increasing rate. The replacement work includes a tide gate for Jacobs Avenue drainage at the Eureka Slough, dual tide gates near Airport Road, one adjacent to Mid-City Motor World, one at Brainard Slough, one at Jacoby Creek, and a triple gate at Gannon Slough. To enhance fish habitat, a rock weir would be installed downstream of the tide gates at Gannon Slough. Note: Tide gates are not part of the Route 101 roadway; however, tide gates function to minimize flooding of adjacent low elevation lands. At some locations, tide gates also function to prevent brackish bay water from entering bodies of freshwater or killing saltwater intolerant vegetation.

7. Add or replace roadway lighting on Route 101 at Cole Avenue, Indianola Cutoff, Bayside Cutoff, South G Street, and the Route 101/255 Interchange. Trenching would be required to place new subsurface electrical conduit between the lights and services.

8. If needed, the project may include installing metal beam guardrail with the appropriate end treatments at three billboards adjacent to the southbound lane south of Bracut. The guardrail would protect errant vehicles from striking these fixed objects (billboards). (The existing billboards are outside the existing state highway right-of-way, but are within the 30-foot clear recovery zone. Again, if needed, the proposed metal beam guardrail would be within the existing highway right-of-way.)

9. Reset/replace guardrail at some locations along the corridor to comply with current guidelines.

10. Remove one tree and one group of shrubs within the corridor that are within the 30-foot clear recovery zone. (See Appendix A for tree removal locations and tree removal discussion in Chapter 3, Section 3.1.7. Visual/Aesthetics.)

11. Remove the existing metal beam guardrail median barrier, and install a high tension cable barrier and paving in the median from approximately 370 feet north of the Gannon Slough bridge to the 11th Street overcrossing in Arcata.

[8] The Draft Environmental Impact Report/Statement for this project stated that northbound Gannon Slough Bridge would be widened. The widening work has subsequently been dropped from the project scope of work.

12. Remove signage within the Safety Corridor from the Eureka Slough bridge to Gannon Slough. After project construction, the current posted speed limit of 50 mph between the Eureka Slough bridges and Gannon Slough bridges would remain at the existing 50 mph. However, 45 days after project construction, Caltrans would conduct an Engineering and Traffic Survey to comply with the California Vehicle Code. The California Vehicle Code requires a renewed engineering and traffic survey whenever substantial changes in roadway or traffic conditions have occurred. If the prevailing 85th percentile of traffic eventually rises above 55 mph after project construction, Caltrans would be required to address the condition. Raising the posted speed limit would be considered and possibly implemented.

Plan sheets showing the proposed improvements and typical roadway cross sections are located in Appendix A.

Alternative 1 – Consequences Summary
(See Chapter 3 for detailed discussion)

Alternative 1 would:

- Substantially enhance traffic safety by eliminating left turn and crossing movements at Route 101 intersections;

- Remove Safety Corridor signage, etc., which may encourage drivers back to Route 101. See Safety Corridor discussion in Chapter 3, Section 3.1.6 – Traffic and Transportation;

- Have 2.4 acres of permanent U.S. Army Corps of Engineers (USACE) jurisdictional wetland impact, which is the least wetland impact of the Build Alternatives. Would also have 1.3 acres of permanent State Coastal jurisdictional wetland impact for a total of 3.7 acres of permanent wetland impact. For an explanation of wetland types, refer to Chapter 3, Section 3.3.2 - Wetlands;

- Substantially change access to businesses and residences creating substantial out-of-direction travel and corresponding delay; would degrade the LOS on Old Arcata Road from traffic diverting from Route 101 to Old Arcata Road; see Table 3-3 – Round Trip out-of-direction travel distances and discussion in Chapter 3, Section 3.1.6 – Traffic and Transportation;

- Create substantial economic hardship on businesses and residents. For this reason Alternative 1 is strongly opposed by a high number of residents and business owners along the Route 101 corridor between Eureka and Arcata. See Chapter 3, Section 3.1.1 – Land Use, Community, Businesses;

- Access restrictions (elimination of left-turn and crossing movements) resulting in a substantial adverse and disproportionate effect to two existing Environmental Justice communities within Route 101 corridor between Eureka and Arcata. See

Chapter 3, Section 3.1.4 for more information regarding Environmental Justice communities;

- Create substantial additional energy use (and air pollution) over that of Alternatives 2 or 3. See Chapter 3, Section 3.2.8 – Energy;

- Substantially increase traffic volumes on Old Arcata Road. See Table 3-9 – Projected Increase in Traffic Volumes in Chapter 3, Section 3.1.6 - Traffic and Transportation.

Total estimated cost of Alternative 1 in 2016 dollars is $24 million.

Alternative 1A – Restore and Rehabilitate Roadway Project with Median Closures and Three Turnarounds with Auxiliary Lanes and a Signal for Southbound Left Turns Only at Airport Road

This Alternative includes all features of Alternative 1, but adds turnarounds (U turns) at three locations. (See Appendix A for turnaround locations. Also see Chapter 3, Section 3.1.6 – Traffic and Transportation for a discussion of how the turnarounds would operate.) As with Alternative 1, the Route 101 medians would be closed, thereby eliminating left turn and crossing movements at intersections which would eliminate the potential for broadside collisions. The turnarounds would substantially reduce out-of-direction travel without constructing a new grade separation or interchange. This Alternative also includes a signal for southbound left turns only at Airport Road. In other words, traffic on northbound Route 101 and Airport Road would be signalized to allow left turn movements from southbound Route 101 to Airport Road. Alternative 1A includes the following (in addition to the features of Alternative 1):

- Realign Route 101 at PM 81.9 to 82.1 (between Mid-City Motor World and Indianola Cutoff) and construct turnarounds for northbound to southbound and southbound to northbound traffic at PM 81.99 and PM 82.01 respectively;

- Construct two additional northbound lanes from PM 82.0 to PM 82.7 (southbound to northbound turnaround to Indianola Cutoff), for a total of four northbound (NB) lanes. The additional northbound lanes would require constructing a 600-foot-long, 8-foot-high retaining wall along the Route 101 slough.

- Realign Route 101 from PM 83.15 to PM 83.5 (Bracut area) and construct a turnaround from northbound to southbound at PM 83.30;

- Construct a southbound left turn only signal at Airport Road at PM 80.8, controlling southbound Route 101 traffic left turn movements to Airport Road and stopping northbound Route 101 traffic only. Left turns for westbound traffic at Airport Road would be accomplished by entering Route 101 northbound and merging into the northbound to southbound turnaround at PM 81.99;

- The turnarounds would require posting new roadway signs to inform motorists of turnarounds.

Constructing the turnaround at Bracut would require right-of-way acquisition from a private business in Bracut. (See Plan Sheets 7-9 and 14-16 in Appendix A.)

Plan sheets showing the proposed improvements and typical roadway cross sections are located in Appendix A.

As with Alternative 1, Alternative 1A would also meet the minimum project need and purpose. However, traffic delay for Alternative 1A would be much less compared to Alternative 1 since the three turnarounds and left turn signal for southbound traffic at Airport Road would substantially minimize out-of-direction travel after the medians are closed. Effects to local roads, such as Old Arcata Road, would be minimal compared to Alternative 1. This Alternative was dropped primarily due to lack of public acceptance. Also, a system of turnarounds does not meet driver expectation for a high traffic location and the need for numerous motorist lane merges to utilize turnarounds may not necessarily reduce collisions to the maximum extent that a facility that meets driver expectation could achieve. The turnarounds would also result in more permanent filling of wetlands than Alternative 1; this is discussed in detail in Chapter 3, Section 3.3.2.

When simply comparing current statewide average collision rate groups, the Safety Conformance Criterion is not met with the installation of a traffic signal at any intersection within the corridor. However, collision rates can be reduced at signalized intersections with the addition of carefully planned and appropriately designed safety countermeasures. Features such as rumble strips and ITS (Intelligent Transportation System) technology, if supported and funded by the City of Eureka, could be used at this location to meet Safety Conformance Criteria.

Alternative 1A – Consequences Summary
(See Chapter 3 for detailed discussion)

Alternative 1A would:

- have 5.5 acres of permanent USACE jurisdictional wetland impact and 1.7 acres of permanent State Coastal jurisdictional wetland impact for a total of 7.2 acres of permanent impact. While Alternative 1A would have less impact than the other Alternatives except Alternative 1, Alternative 1A does not serve all modes of travel as safely and efficiently as a grade separation.

- moderate the effect to two Environmental Justice communities compared to Alternative 1.

- Increase out-of-direction travel and delay resulting from access restrictions for bicyclists.

- not degrade the LOS on Old Arcata Road beyond the No-Build Alternative.
- moderate energy and air quality impacts from out-of-direction travel compared to Alternative 1.
- have more adverse impacts to visual resources compared to other proposed alternatives since up to 83 trees would need to be removed, which would include 30 mature eucalyptus trees along the southbound lanes for the turnaround lanes.

Total estimated cost of Alternative 1A in 2016 dollars is $35 million.

Alternative 2 - Restore and Rehabilitate Roadway Project with Median Closures and Grade Separation (interchange) at Indianola Cutoff

Alternative 2 includes all of the elements of Alternative 1 with the exception that a compact diamond grade separation with an Indianola Cutoff undercrossing is proposed. (See Plan Sheets 10-13 in Appendix A for locations.)

The on-ramps at the proposed Indianola Cutoff grade separation would be approximately 2,600 feet long and the off-ramps approximately 2,000 feet long. The Route 101 through lanes would be elevated approximately 25 feet above Indianola Cutoff and would have separate north and southbound bridges approximately 112 feet long with paved widths of 39 feet. The median width through the grade separation would be reduced to 50 feet and include median barrier installation. Stop signs would be placed at the northbound and southbound Route 101 off-ramps at Indianola Cutoff.

Roadway lighting would be installed at exit and entrance ramps as well as the intersections of the ramps connecting to Indianola Cutoff. The electrical service and conduit would be trenched from the service location to the lights.

Plan sheets showing the proposed improvements and typical roadway cross sections are located in Appendix A.

As with Alternatives 1 and 1A, Alternative 2 would meet the project need and purpose. However, traffic operations for Alternative 2 would be superior to Alternative 1 since the grade separation would substantially minimize out-of-direction travel after the medians are closed. Effects to local roads, such as Old Arcata Road, would be minimal compared to Alternative 1. The grade separation would result in more permanent filling of wetlands than Alternatives 1 and 1A. This issue is discussed in detail in Chapter 3, Section 3.3.2.

Alternative 2 - Consequences Summary
(See Chapter 3 for detailed discussion)

Alternative 2 would have similar consequences as Alternative 1 except as follows:

- Alternative 2 would have 10.4 acres of permanent USACE jurisdictional wetland impact and 2.1 acres of permanent State Coastal jurisdictional wetland impact for a total of 12.5 acres of permanent wetland impact.
- Although access to businesses and residences would be restricted, the proposed grade separation included in Alternative 2 would moderately reduce out-of-direction travel, delay, and additional energy use when compared to Alternative 1; however, southbound Route 101 traffic accessing the Airport Road/Jacobs Avenue businesses would be substantially impacted.
- Environmental Justice Communities would be moderately affected by access restrictions as compared to Alternative 1.
- Alternative 2 would not degrade LOS on Old Arcata Road beyond the No-Build Alternative.
- Alternative 2 would require removing up to 64 trees, including 40 trees to construct the grade separation at Indianola Cutoff.

Total estimated cost of Alternative 2 in 2016 dollars is $60 million.

Alternative 3 - Restore and Rehabilitate Roadway Project With Median Closures and Grade Separation at Indianola Cutoff and Signalized Intersection at Route 101 and Airport Road

Alternative 3 includes all of the elements of Alternative 2 except instead of closing the median at Airport Road, Airport Road would be realigned and fully signalized at Route 101. The signal was designed for a LOS “C” for both Route 101 and Airport Road. Airport Road would provide dedicated lanes for both left and right-turning vehicles. A left turn lane pocket would be provided for southbound Route 101 traffic turning left to Airport Road and would allow for truck U-turns. U-turns for passenger vehicles would be allowed from both directions. Furthermore, speed for southbound traffic approaching the intersection would be reduced north of the intersection with Airport Road. Reduced speed for northbound Route 101 traffic would be maintained from V Street in Eureka to Airport Road.

Due to the close proximity of the intersections of Airport Road/Route 101 and Airport Road/Jacobs Avenue, Airport Road would be relocated to the north to improve traffic operational efficiency by providing adequate queuing distance for left turning vehicles. The relocation would require realigning Airport Road outside of the existing State right-of-way, across the end of an abandoned runway, and across the existing ditch east of Route 101 to a new intersection location on Route 101.

Construction work outside of the existing State right-of-way would require an acquisition of airport property and encroachment permit from the County of Humboldt for work within the Murray Field (county airport), which the County has stated it would not grant.

An additional lane would be constructed from the Cole Avenue acceleration lane to Mid-City Motor World to maintain LOS "C" on Route 101. To minimize impacts to wetlands and existing drainage patterns, a retaining wall would be required for a portion of the lane between Jacobs Avenue and Airport Road. The widening for the additional lane north of the Airport Road intersection would occur within the median to avoid any further encroachment into the airport's flight approach/departure surface. The additional lane would make a transition to the deceleration lane to exit Route 101 at Mid-City Motor World. Plan sheets showing the proposed improvements and typical roadway cross sections are located in Appendix A.

Alternative 3 would be superior to Alternative 2 since the full signalization at Airport Road would further minimize out-of-direction travel after the medians are closed. The proposed Indianola Cutoff grade separation and Airport Road signalization combined would result in more permanent filling of wetlands than all other Build Alternatives. This issue is discussed in detail in Chapter 3, Section 3.3.2.

Alternative 3 - Consequences Summary
(See Chapter 3 for detailed discussion)

Alternative 3 would:

- have similar consequences as Alternative 2 except that fully signalizing Airport Road at Route 101 would provide substantially better access for most of the businesses and residences along the Route 101 corridor, thereby reducing out-of-direction travel, delay, and additional energy use when compared to Alternatives 1 and 2.
- require acquisition of Right of Way from the airport
- result in permanently filling a total of 15.1 acres of wetland consisting of 12.9 acres of USACE jurisdictional wetland impact and 2.2 acres of State Coastal jurisdictional wetland impact.

Total estimated cost of Alternative 3 in 2016 dollars is $68 million.

Modified Alternative 3A (the Preferred Alternative identified in the Final EIR/S) Restore and Rehabilitate Roadway Project with Median Closures and Minimized Width Grade Separation at Indianola Cutoff and a Half Signal at Airport Road

This alternative is similar to Alternatives 2 and 3, but includes adding a half signal for southbound Route 101 traffic making left turns only at Airport Road and stopping northbound Route 101 traffic only (half signal). Left turns for westbound traffic at Airport Road would be allowed when northbound traffic is stopped at the signal. This alternative does not require the acquisition of airport property described in Alternative 3. This alternative includes guardrail and median barrier work.

This Alternative also includes building a grade separation at Indianola Cutoff with steeper side slopes and a more narrow median than the originally proposed grade separation under Alternatives 2 and 3 to reduce wetland impacts. The modified compact diamond grade separation would have maximum slopes of 1.5:1, and a 112-foot long northbound and southbound bridge connected by an all-paved 22-foot-wide median.

Modified Alternative 3A – Consequences Summary
(See Chapter 3 for detailed discussion)

Modified Alternative 3A would:

- have 8.2 acres of USACE jurisdictional wetland impact and 2.0 acres of permanent State Coastal jurisdictional wetland impact for a total of 10.2 acres of permanent wetland impact;
- minimize adverse effect to two Environmental Justice communities compared to Alternatives 1, 1A, and 2;
- minimize out-of-direction travel and delay resulting from access restrictions for both motorists and bicyclists compared to Alternatives 1, 1A, and 2;
- have minimal effect to Old Arcata Road and State Route 255;
- have minimal energy and air quality impacts from out-of-direction travel compared to the No-Build Alternative;
- serve non-motorized traffic and provide better connectivity from east of the highway to the west (and vice versa) compared to Alternatives 1, 1A, and 2.

Total estimated cost of Modified Alternative 3A in 2016 dollars is $58 million.

Alternative 7 – No-Build

Alternative 7 is the No-Build Alternative, which represents the existing baseline condition for comparison purposes only. Consequently, there are no proposed improvements such as speed limit changes within the Eureka-Arcata Corridor under the No-Build condition. The No-Build does not meet the project need and purpose. This alternative retains the current Route 101 roadway alignment and intersection access (including median openings). The existing Safety Corridor signage, posted 50 mph speed limit, and daylight use of headlights would also remain until conditions warranted removing or modifying the Safety Corridor elements.
Caltrans would periodically conduct Engineering and Traffic Surveys to comply with the California Vehicle Code. The California Vehicle Code requires a renewed engineering and traffic survey whenever substantial changes in roadway or traffic conditions have occurred. If the prevailing 85th percentile of traffic eventually rises above 55 mph after project construction, Caltrans would be required to address the condition; raising the posted speed limit would be considered and possibly implemented. The existing Safety Corridor lacks the double fine zone for speeding, enhanced public education, and increased traffic enforcement which were previously part of the Safety Corridor.

The Safety Corridor was implemented as a temporary measure to reduce the intersection collision rate between the Eureka Slough bridges and the Jacoby Creek bridges until permanent, long-term improvements could be constructed. (See Chapter 1 for more Safety Corridor information.)

Although the overall number of collisions decreased during the Safety Corridor implementation, the fatal plus injury collision rate at Indianola Cutoff and Mid-City Motor World median crossings remain greater than twice the statewide average (see Figure 1-2). The Safety Corridor effectiveness is expected to further decrease over time as traffic volumes increase. On Route 101, between Eureka and Arcata, the average annual daily traffic is expected to increase from 37,000 vehicles per day in 2014 to 50,000 by 2041. (See Chapter 1 for more information.)

Moreover, a review of safety corridors on other highways within the State has shown that their effectiveness is short-lived. Among the explanations given by traffic safety engineers for this loss of effectiveness is the phenomenon of habituation. Consequently, warning signs, which rely upon driver alertness and attentiveness, are not long-term meaningful substitutes for permanent structural improvements using the latest design standards.

Despite the Safety Corridor, an increase in traffic volumes and speeds in the corridor could result in more frequent traffic collisions. Without some form of traffic control or grade separation, drivers are required to wait for opportunities (in the form of gaps in traffic) to complete left turn movements or cross highway movements at intersections. As traffic volumes increase, or traffic speeds increase, the traffic gaps become shorter resulting in less margin for error for both oncoming traffic and turning vehicles. In addition, if the wait for adequate gaps in traffic is perceived to be too long, some drivers may become impatient and attempt to turn left or cross traffic in too short of a traffic gap.

If a traffic gap is misjudged and is actually insufficient, broadside collisions can occur when turning or when crossing vehicles move across opposing lanes of traffic. Overall, an increase in traffic volumes and speeds are substantial collision factors.

In 2006, the average 85th percentile in the corridor was 54 mph; in 2008 it was 55 mph; and 2010 it was 56 mph. The current trend is that the prevailing speeds within the Eureka-Arcata Corridor are increasing. It is possible to lower the posted speed limit; however, under the California Vehicle Code, speed limit reduction must be based on an engineering and traffic survey (E&TS).

The E&TS must include consideration of at least the following:

1. Prevailing or 85th percentile speeds, determined by traffic engineering measurements;

2. Collision history;

3. Highway, traffic, and roadside conditions not readily apparent to the driver.

(Source: State of California Vehicle Code Sections 627, 22349, and 22354, 2015)

The 85th percentile is defined as that speed at or below which 85 percent of the traffic is moving. Prevailing traffic speeds are measured in free-flow conditions, generally every seven years. When posting a reduced speed zone on the basis of an E&TS, the speed limit is posted at the 5-mph increment nearest the 85th percentile speed. It is possible that the speed limit could be reduced by 5 mph, and no more, if a registered engineer certifies that there are conditions on the highway section not readily apparent to drivers. An elevated collision history gives firm evidence of such conditions, and allows the speed limit to be set 5 mph lower than the rounded 85th percentile. On the other hand, if prevailing speeds increase enough, a speed limit higher than the existing posted speed limit of 50 mph is possible.

In addition to safety concerns, there are LOS concerns for non-signalized left turns onto and off Route 101 which are currently allowed at all intersections—except Cole Avenue. Both the year 2013 and 2041 No-Build Alternative LOS for left turn movements from local streets and driveways onto Route 101 were calculated to be “F” at all Route 101 median access locations. For the year 2013, left turn movements off Route 101 to local streets and driveways range from LOS “B” to “D”. The left turn movements off of Route 101 range from LOS “C” to “F” in the year 2041 for the No-Build Alternative (no signalization or interchange). As traffic volumes increase over time, the number of vehicles waiting to make left turn movements to and from Route 101 at the median openings would increase, along with higher traffic speeds and volumes on Route 101 through lanes resulting in further reducing the effectiveness of the Safety Corridor.

Without physical safety improvements (such as traffic control or grade separation), collision rates could return to pre-safety corridor levels, regardless of any new or extended enhanced enforcement period — even assuming one was available. As stated previously, traffic volumes and speeds are expected to increase in the future, which in turn would cause an increase in collision rates. It is likely that an increase in severe or fatal collisions could trigger an immediate need to close the existing median openings to avoid further severe collisions. Closing one or more medians could potentially restrict access to businesses and residents, add out-of-direction travel and delay, increase fuel consumption, increase greenhouse gas production, and adversely affect the LOS of local streets as well as State Route 255. The potential impacts would be similar to Alternative 1 as discussed in the next chapter.

Finally, the No-Build Alternative would not improve the existing acceleration /deceleration lanes and three of the existing bridges within the project limits that do not meet current highway design standards. In addition, fixed objects within the roadway clear recovery zone would remain potential hazards for vehicles making emergency maneuvers and for errant vehicles.

Based on these findings, the No-Build Alternative (Alternative 7) does not meet the project need and purpose. The No-Build Alternative is evaluated in this document as a basis for comparison with the Build Alternatives even though it does not meet the project need and purpose. The No-Build Alternative would avoid any immediate environmental impacts or costs. Other projects to maintain the road would be initiated as needed.

For more No-Build Alternative traffic related information, refer to Chapter 3, Section 3.1.6 - Traffic and Transportation. This section includes a description of the existing and future conditions without any major Route 101 corridor improvement work.

Alternative 7 (No-Build) - Consequences Summary
(See Chapter 3 for detailed discussion)

Alternative 7 would:

- continue to allow uncontrolled left turns and crossing movements at intersections would remain, as well as the posted existing 50 mph speed limit between the Eureka Slough and Gannon Slough bridges;
- have no wetland impacts;
- leave large trees and unshielded billboards[9] within the clear recovery zone on the east side of Route 101;
- have no effect to State or Federal Threatened or Endangered Species.

[9] The California Coastal Commission imposed a Federal Coastal Consistency condition to remove billboards within the Route 101 corridor where feasible. At the time of this writing, the identification of which billboards to remove had not been determined.

The existing Route 101/255 interchange ramps, existing acceleration/deceleration lanes, and three of the existing bridges within the project limits would remain non-standard in terms of bridge rail standards. The southbound Jacoby Creek bridge is also structurally obsolete.

Based on Route 101 traffic trends between Eureka and Arcata, both vehicle speeds and volumes on Route 101 are predicted to increase. Consequently, in the foreseeable future, deteriorating highway conditions would likely necessitate closing one or more Route 101 median openings to maintain safety and minimize collisions.
One or more median closures would restrict access to businesses and residences and result in out-of-direction travel, increased energy consumption and travel delay, and the Level of Service (LOS) on Old Arcata Road could substantially degrade.

2.3 Identified Preferred Alternative

As discussed previously in this chapter, a wide range of project alternatives were initially considered in 1999 that could potentially meet the stated project need and purpose. Many of the alternatives studied included a number of variations resulting from grade separation, signalization, and frontage road locations and combinations. Most of the alternatives that were considered have been eliminated, leaving a reasonable range of feasible alternatives considered in this analysis. After a screening and preliminary evaluation process, Caltrans and FHWA presented three Build Alternatives that were fully evaluated in the Draft Environmental Impact Report/Statement (EIR/S). (See Chapter 2, Section 2.2 for more information.)

Soon after the Draft EIR/S was approved for public circulation, a public hearing was held on August 7, 2007. Hundreds of comments from local governments, public agencies, organizations, and individuals were received. (See Chapter 5 and Volume III and IV for copies of the comments and corresponding responses.) Although many of the comments voiced strong concerns about the need for the project or disagreed with certain elements of the project, most comments did not state opposition to the project. Many comments expressed opposition to Alternatives 1 and 2, but favored Alternative 3 since it included both a grade separation and a full signal at Route 101 and Airport Road. There were also many comments stating no improvements were needed since the existing Safety Corridor was perceived as effective. Overall, however, most comments reflected a need for improving the Route 101 corridor.

After the public circulation of the Draft Environmental Impact Report/Statement (DEIR/S), the County of Humboldt requested the study of an alternative with turnarounds in place of a grade separation at Indianola Cutoff. Consequently, Alternative 1A was developed and evaluated in this document. This alternative is similar to Alternative 1 except that it includes three median turnarounds and a Route 101 southbound left turn only signal at Airport Road. (See Chapter 2, Section 2.2 for a complete description of Alternative 1A.)

(Unmodified) Alternative 3A was also designed after the circulation of the DEIR/S. It is similar to Alternative 3 except that the proposed grade separation at Indianola Cutoff was redesigned to reduce the wetland impact. This alternative also includes a southbound left turn only signal at Airport Road, which would completely avoid the County airport (Murray Field). Alternative 3A was designed to enhance safety while providing the most effective bicycle access because the proposed grade separation would provide highway crossing midway between Eureka and Arcata at the busiest intersection. Alternatives 1A and 3A were presented at a public meeting on December 3, 2008. Many of the comments received from the public again stressed tree preservation, public and non-motorized transit, climate change / sea level rise concerns, safety concerns about turnarounds in Alternative 1A, and safety concerns pertaining to a proposed signal at Route 101 and Airport Road.

In response to public and agency comments, all five Build Alternatives were re-evaluated and designs were refined to avoid removing most of the trees that were identified to be removed in previous designs. Additional wetland preservation and impacts to endangered species habitat were further reduced by avoiding impact driving of bridge piles and eliminating the widening of northbound Jacoby Creek and Gannon Slough bridges from the project. Any one of the five Build Alternatives discussed in this Final EIR/S meet the project need and purpose as stated in Chapter 1 of this document.

After the Build Alternatives were modified, a Clean Water Act Section 404(b)(1) Alternatives Analysis was subsequently prepared because selection of any of the proposed Build Alternatives would require an U.S. Army Corps of Engineers (USACE) Section 404 Individual Permit. The 404(b)(1) document included an analysis of impacts to aquatic resources and associated sensitive species for each alternative in compliance with the Clean Water Act Section 404(b)(1) Guidelines. In addition, the analysis documents the rationale of selecting the least environmentally damaging practicable alternative (LEDPA) based on specific evaluation criteria developed for the project while meeting the need and purpose for the project. The selection process involves a discussion of impacts of each alternative and why the other alternatives do not qualify. When evaluating harm to non-aquatic resources (e.g., businesses and residents) versus jurisdictional aquatic resources, the alternatives selection process evaluates reasonable and prudent alternatives based on the “net harm” (after mitigation) of the alternative to Environmental Justice communities. Refer to the Summary of Potential Environmental Impacts Table in the summary of this document for a comparison of impacts by alternative.

In this analysis, Caltrans and FHWA, in consultation with state and federal resource agencies, identified Alternative 3A as the LEDPA and the Preferred Alternative in terms of balancing benefits and impacts to the overall environment while meeting the project need and purpose. While Alternative 3A would impact 5.8 more USACE jurisdictional wetland acres than Alternative 1, Alternative 3A would have the least damage to the overall environment in terms of avoiding adverse environmental consequences to human use characteristics and other environmental resources.

This analysis of the proposed alternatives presents information that eliminates Alternatives 1, 1A, 2, 3, and the No-Build Project as the LEDPA. Alternative 1 was rejected for its substantial impacts to Environmental Justice communities (discussed in Chapter 3) and substantial adverse effects resulting from out-of-direction travel. Feasible mitigation, such as constructing a new frontage road, is not available to reduce or compensate for impacts by Alternative 1 to Environmental Justice communities or the local businesses in the project area. Alternative 1A would result in substantial adverse effects to non-motorized traffic as well as potentially creating driver confusion. Alternatives 2 and 3 were rejected because of direct impacts to aquatic resources.

The 404(b)(1) Alternatives Analysis became the basis for selecting the LEDPA as part of the NEPA/404 Integration process. The NEPA/404 Integration participants met and agreed on project need and purpose, and concurred with the transportation modal choice statement and the range of alternatives to be studied. For more information regarding the NEPA/404 Integration Process, refer to Appendix E.

The NEPA/Section 404 Integration Process involves both state and federal resource agencies, including the FHWA, and they met in June 2009 to discuss a proposed LEDPA as well as the Conceptual Wetland Mitigation Plan. On July 3, 2009, the finalized Section 404(b)(1) alternatives analysis and updated conceptual mitigation plan was sent to the NEPA/404 agencies requesting LEDPA concurrence for Alternative 3A.

However, at a September 2009 HCAOG public meeting, objections to Alternative 3A were made since this alternative did not accommodate left turns from Airport Road to southbound Route 101. Consequently, Caltrans modified Alternative 3A to include this move. (See the plan sheets in Appendix A showing the proposed modification at the Route 101/Airport Road intersection.) To allow left turn movements to southbound Route 101, intersection improvements would result in 0.5 acre of additional U.S. Army Corps of Engineers (USACE) wetland impact compared to the original Alternative 3A. Ongoing consultation with U.S. Fish and Wildlife Service (USFWS) resulted in a change at the proposed tide gate at Gannon Slough which would include constructing a rock weir to improve fish habitat and access to the new "fish-friendly" tide gate. Modified Alternative 3A is now identified as the project Preferred Alternative. The original Alternative 3A has been dropped from consideration and is not evaluated in this document.

Project Construction Details

Grade Separation (interchange) Construction Work at Route 101/Indianola Cutoff

Alternatives 2, 3, and Modified 3A include constructing a new grade separation at the Route 101/Indianola Cutoff intersection which would require driving piles below the existing highway fill. The exact number and type of piles have not been determined. If precast, pre-stressed concrete piles are used, about 20 at each of the two abutments would be driven in place. The concrete piles would either be 14-inch square or 15-inch octagonal piles. Alternatively, instead of concrete piles, the structure design could require 30-inch or 36-inch diameter cast-in-place steel shell piles with up to 10 piles at each of the two abutments. The excavated earth would be removed from inside the steel shell pile and filled with reinforced concrete. After the Final Environmental Impact Report/Statement is approved, final engineering designs will be completed and the exact number, type, and location of piles determined.

Before imported fill is placed for the interchange, a 2-foot thick layer of compacted imported borrow would be placed and then overlain with a 1-foot thick permeable blanket. Prefabricated Vertical Drains (PVD's),[10] also known as wick drains, would be installed to varying depths at a spacing distance of 6 to 16 feet. The number, spacing and depth of PVDs would be determined after further subsurface investigations and structural designs are completed.

Bridge Construction Work at Jacoby Creek and Gannon Slough

At both Jacoby Creek and Gannon Slough, there are pairs of bridges to accommodate Route 101 traffic in both directions. All Build Alternatives include replacing the bridge rail on the northbound Jacoby Creek and Gannon Slough bridges and completely replacing the southbound Jacoby Creek bridge. See Typical Section X-3 and Plan Sheets in Appendix A.

Replacing the Southbound Jacoby Creek Bridge

The new southbound Route 101 Jacoby Creek bridge would be approximately 74 feet long and 43 feet wide (about 4 feet wider than the current bridge). The additional width would provide improved pedestrian and bicycle passage across this bridge. The new bridge would have about 1,073 square feet more surface area as compared to the existing bridge.

[10] Prefabricated Vertical Drains (PVD's) are made from corrugated plastic and are about four-inches wide and one-eighth of an inch thick, covered in filter fabric. When (earth) fill material is placed to raise the roadway (over Indianola Cutoff), the added weight from the fill would compress water from saturated soil beneath the fill. The vertical drains allow the underlying water from the saturated soils to redistribute allowing the underlying soil to compact, or settle, more efficiently. Vertical drains reduce the time for the soil to settle from as long as ten years down to only six months, which would in turn reduce the need to repave areas that would have continued to settle for years.

The new bridge would be single span with no piers in the channel—unlike the current bridge which is a three-span structure with pier supports within the creek channel.

The new bridge would be erected to the east of the current alignment. Approximately 14 3-foot diameter cast-in-place steel shell piles would be oscillated or rotated into place: seven piles on each side of the bank—three per side of bank for the temporary bridge and four per side of bank for the permanent bridge. The piles would be about 15 feet from the creek-bay mean high water elevation. The depths that the piles would need to be set are not currently known; however, depths could be up to 100 feet pending the outcome of further design. Excavated earth would be removed from inside the upper section of the steel pipe pile and filled with reinforced concrete. All excavated material would be contained to prevent sediment from entering waterways, or the excavated material may be placed directly into dump trucks and carried to an approved disposal site. Bridge replacement would involve the following construction steps:

1. In the median on both sides of Jacoby Creek, two areas, each about 55-feet-long by 15-feet-wide by 7-feet-deep, would be excavated east of the existing bridge for the new bridge abutments. Water would likely enter the excavation and dewatering or seepage prevention would be required. These excavations would be above the mean high tide line, avoiding the Jacoby Creek channel.

2. Within each of these excavations, three 3-foot diameter piles would be oscillated or rotated in place. The piles would be about 15 feet from the creek-bay channel mean high water elevation. Pile impact driving would be avoided.

3. Forms and reinforcing would be placed in the excavations, and concrete abutments would be poured.

4. East of the existing bridge, the new bridge deck would be installed. Precast box beams that would comprise the new bridge would be lowered into place with a crane, cemented/bolted together, paved and the bridge rail installed. Temporary fill would be placed for the temporary approaches that would be paved, and traffic would be diverted to the new bridge.

5. The old bridge would be demolished and the existing bridge deck would be removed. Containment measures would be employed to prevent concrete debris from falling into Jacoby Creek. The bridge abutments would be broken up and excavated out.

6. The old bridge piers would be cut off above the stream bottom (without excavation) during low tide to minimize turbidity.

7. In the excavated areas of the old abutments, new abutments would be extended to the west along both banks of Jacoby Creek from the detour bridge abutments. The remaining eight 3-foot diameter steel shell piles (four on each side of Jacoby Creek) would be installed on the banks about 15 feet from the channel for the second set of abutments.

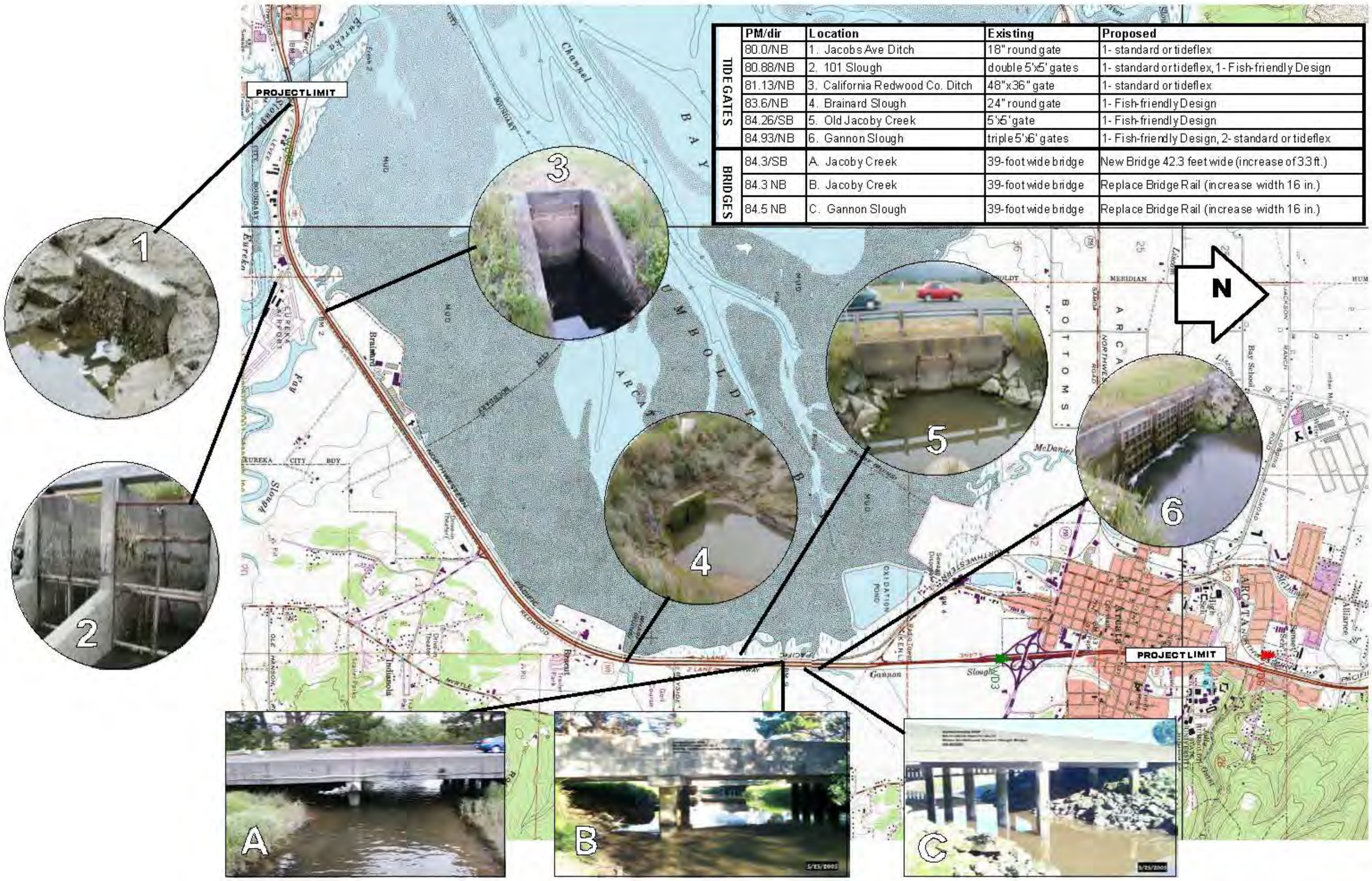
8. The southbound roadway would be closed for one night. Southbound Route 101 traffic would be detoured on State Route 255 for one night. Using the jack-and-slide method, the new bridge would be moved approximately 52 feet to the west, in the original alignment with the highway.

9. Temporary fill and pavement for detour approaches would be removed and the new bridge would then be paved and striped.

Tide Gates

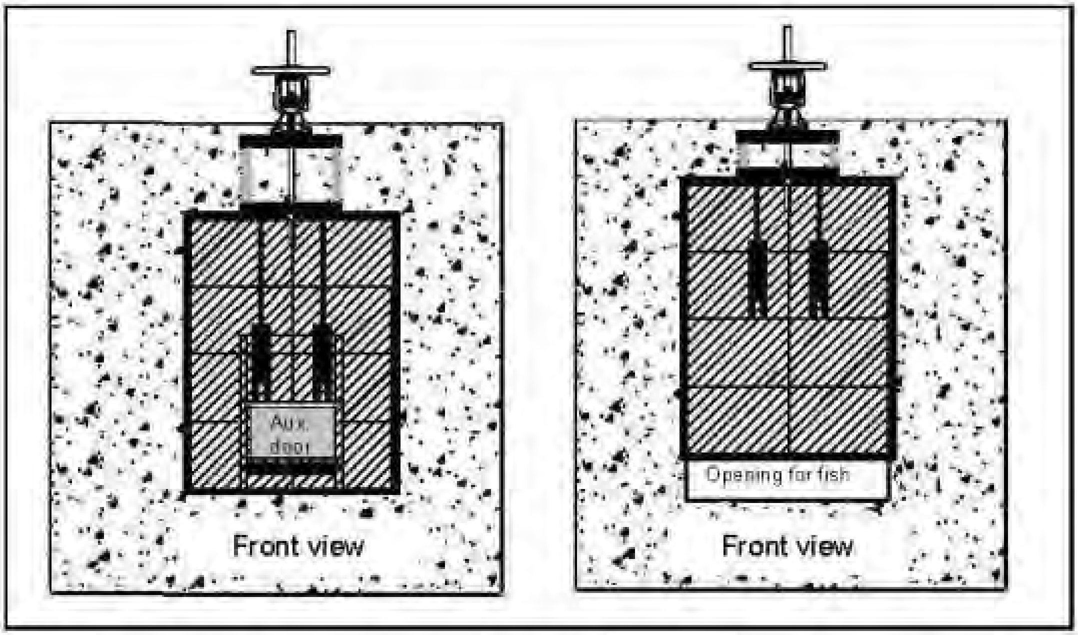
The existing tide gates, on culverts that extend under the Route 101 roadway, minimize tidal waters from inundating the surrounding pasturelands. (See Chapter 3, Section 3.2.1 for more information.) All the existing tide gates within the project limits would be replaced. There are six locations with a total of nine tide gates (Figure 2-1). All the present tide gates have a top-hinged flap gate design, either round or rectangular. At the locations where fish may be present, a “fish-friendly” tide gate with an auxiliary door would be installed. To enhance fish habitat, a rock weir would be placed downstream of the tide gates at Gannon Slough. If there are fish and more than one tide gate at the same location, only one gate with an auxiliary door would be installed. The locations of fish-friendly tide gates were reviewed and accepted by CDFW, NOAA Fisheries and USFWS. The 101 Slough, Brainard Slough, Old Jacoby Creek, and Gannon Slough are locations where both tidewater gobies and salmonids (special status fish) may be present. (See Chapter 3, Section 3.3.4 for more information regarding special status fish.) The gates with auxiliary doors are similar to the existing gates, with the added feature of a small manually adjustable auxiliary door that can remain open at all times. The small auxiliary door allows muted tidal flow in both directions (Figure 2-2). The ditch that enters Eureka Slough south of Jacobs Avenue and the California Redwood Company ditch have no special status fish present, so these replacement gates would not be the auxiliary door design.

All nine replacement gates would make use of existing headwall structures. They would be installed at the same level as the existing gates. The tide gate work would generally consist of removing the existing tide gates and re-drilling and installing new stainless steel anchors epoxied into existing concrete. The new tide gates would likely be placed by cranes, then bolted into place. There are existing access roads to each of the tide gate locations, with the exception of the 18-inch tide gate south of Jacobs Avenue (it outlets adjacent to the northbound Eureka Slough bridge). At this location, the replacement work would likely be accessed by foot. Tide gate locations and replacements are summarized in the Table 2-2.

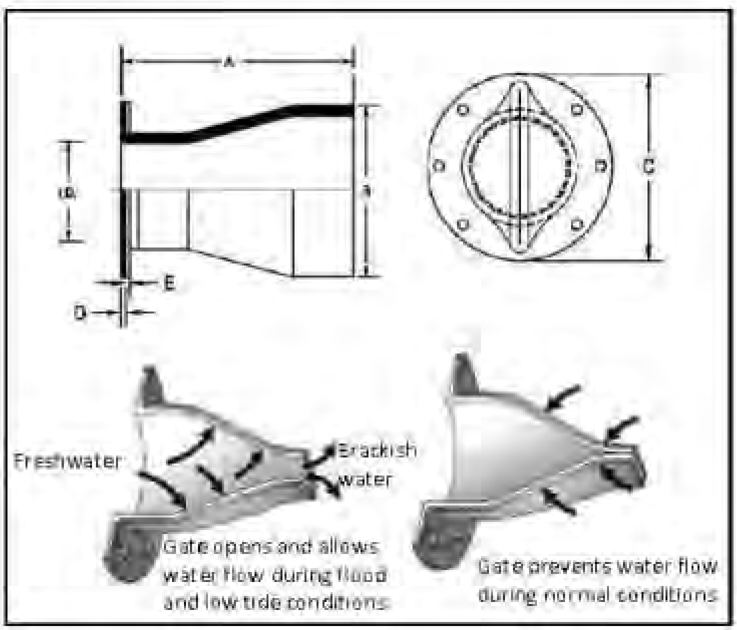


	PM/dir	Location	Existing	Proposed
TIDE GATES	80.0/NB	1. Jacobs Ave Ditch	18" round gate	1- standard or tideflex
	80.88/NB	2. 101 Slough	double 5'x5' gates	1- standard or tideflex, 1- Fish-friendly Design
	81.13/NB	3. California Redwood Co. Ditch	48"x36" gate	1- standard or tideflex
	83.6/NB	4. Brainard Slough	24" round gate	1- Fish-friendly Design
	84.26/SB	5. Old Jacoby Creek	5'x5' gate	1- Fish-friendly Design
	84.93/NB	6. Gannon Slough	triple 5'x6' gates	1- Fish-friendly Design, 2- standard or tideflex
BRIDGES	84.3/SB	A. Jacoby Creek	39-foot wide bridge	New Bridge 42.3 feet wide (increase of 3.3 ft.)
	84.3 NB	B. Jacoby Creek	39-foot wide bridge	Replace Bridge Rail (increase width 16 in.)
	84.5 NB	C. Gannon Slough	39-foot wide bridge	Replace Bridge Rail (increase width 16 in.)

Figure 2-1 Location of Tide Gates



At some locations, current tide gates will be replaced with gates that are more fish-friendly. At the 101 Slough, 2 styles of top hinged fish-friendly gates are being considered. One has a small adjustable auxiliary door (left). The other has an adjustable gate; the entire gate can be raised or lowered (right). Both styles allow muted tidal flow in both directions and provide better time fish passage opportunities than the current gates. Fish-friendly tide gates at other locations will be side-hinged.



At some locations, current tide gates will be replaced with gates that are lower maintenance than the standard flap gate design. The check valve design (i.e. Tideflex®) is virtually maintenance free, however, it also acts as a fish barrier, especially at low flows.

Figure 2-2 Proposed Tide Gates

Table 2-2 Tide Gate Replacement Summary			
Location	**Fish Species**	**Existing Gate(s)**	**Replacement Gate(s)**
1. South of Jacobs Avenue	No fish present	1 – 18″ round	1 – no auxiliary door
2. Highway 101 Slough	Tidewater Goby, Salmonids	2 – 60″ square	1 – no auxiliary door 1 –with auxiliary door for fish passage
3. California Redwood Company Ditch	No fish present	1 – 48″ x 36″ rectangular	1 – no auxiliary door
4. Brainard Slough	Tidewater Goby, Salmonids	1 – 24″ round	1 – with auxiliary door for fish passage
5. Old Jacoby Creek	Possible Presence of Tidewater Goby	1 – 60″ square	1 – with auxiliary door for fish passage
6. Gannon Slough*	Tidewater Goby, Salmonids	3 – 60″ x 72″ rectangular	1 – with auxiliary door for fish passage 2 – no auxiliary door

*In August 2006, the City of Arcata installed a new gate with an auxiliary door at Gannon Slough adjacent to the existing Caltrans tide gates.

Extending Existing Acceleration and Deceleration Lanes

Acceleration lanes and deceleration lanes would be extended at Mid-City Motor World, California Redwood Company (formerly Simpson), Indianola Cutoff (except Alternatives 2, 3, and Modified Alternative 3A), Bracut (east side of highway), and Bayside Cutoff. At Cole Avenue, the existing acceleration onto Route 101 would be closed and the existing deceleration lane would be extended. The acceleration/deceleration lanes typically would include 4-foot-wide right side shoulders, except at Indianola Cutoff where 8-foot-wide right side shoulders would be provided.

To extend the existing acceleration/deceleration lanes on southbound 101 at the California Redwood Company, roadway widening would require realigning the two southbound Route 101 lanes 8 feet towards the median. The realignment would avoid removing any eucalyptus trees to extend the acceleration and deceleration lanes. The initial design of maintaining the existing lane alignment and removing eucalyptus trees for the acceleration and deceleration work has been removed from the project scope of work.

Close Median Crossings

Route 101 median crossings would be closed at the following intersecting roads/driveways: Airport Road (except Alternatives 1A, 3, and Modified Alternative 3A), Mid-City Motor World, California Redwood Company (formerly Simpson), Indianola Cutoff, Bracut, and Bayside Cutoff. Median closures would consist of the removal of asphalt-concrete paving and possibly some excavation and seeding of bare slopes with native or cultivated grasses. The closed areas are proposed for on-site wetland mitigation.

Grade Separation at Indianola Cutoff - Alternatives 2 and 3

The proposed grade separation of roadways consists of elevating Route 101 by up to 25 feet above the existing highway. There would be northbound and southbound bridge(s) crossing Indianola Cutoff. Indianola Cutoff would continue at its present alignment and grade. Modified Alternative 3A would have a steep slope design, which would result in a smaller structural footprint compared to Alternatives 2 and 3. The overall project would generate a negligible quantity of excavated material (utility trenching and structure foundation excavation); any material generated would be reused in the large fill required to construct the grade separation at Indianola Cutoff. (See Chapter 3, Section 3.3.2 for more discussion about the wetland impacts associated with the proposed grade separation.)

Grade Separation at Indianola Cutoff - Modified Alternative 3A

A compact diamond grade separation would be constructed at Route 101 and Indianola Cutoff. This alternative differs from Alternatives 2 and 3 by having a single bridge to accommodate northbound and southbound traffic with fill slopes steeper than typical standard slopes, with a maximum slope of 1.5:1 (ratio of horizontal to vertical), and the median reduced to an all-paved 22-foot width within the grade separation area. This change reduces the required fill and costs for constructing the grade separation, and also reduces the grade separation width and impact on the wetlands. Landscaping would be included in the project to visually enhance the grade separation.

Full Signal at Airport Road and Bridge Across the Route 101 Slough - Alternative 3

To allow traffic to queue at the intersection of Route 101 and Airport Road, and thus provide LOS “C” for both Route 101 and Airport Road, Airport Road would be relocated across the end of an abandoned runway of the airport, and across the existing ditch east of northbound 101 to a new intersection location on Route 101. (See project layout sheets in Appendix A.) This would allow a minimum of two lanes, 330 feet long, for queuing of turning vehicles from Airport Road or Jacobs Avenue. The new intersection would be approximately 300 feet north of the present intersection with Airport Road.

The vegetated median at the new Airport Road crossing would be filled and paved for the new median crossing. The paving would be removed from the existing median crossing and from Airport Road at its intersection with Route 101. The areas of removed paving would be revegetated to complete the removal/relocation of the intersection.

The Airport Road realignment would also require a new crossing of the Route 101 Slough. The bridge structure would be single span. (A single span structure does not require placing support piles in the slough.) It would not require rock slope protection on the slough banks. This bridge construction work would not incur any impacts to the slough. Although tidewater goby and other fish are known to be present in this slough, installation of the bridge would not likely have any effect on them since the proposed single span bridge would not require placing any piers in the slough.

An additional lane would be constructed from the Cole Avenue acceleration lane to Mid-City Motor World to minimize operational impacts to Route 101 due to placement of a full signal at Airport Road. To avoid placing fill on the existing slope to minimize impacts to wetlands and existing drainage patterns, a retaining wall would be required for a portion of the distance between Cole Avenue and Airport Road. The exposed height of the retaining wall would be approximately 4 feet. The additional width required from Cole Avenue to Mid-City Motor World would vary up to 14 feet. The widening for the additional lane north of the intersection with Airport Road would occur within the median to avoid any further encroachment into the airport’s flight approach/departure surface. (See Layout L-5 in Appendix A for flight approach/departure paths.) The fill for the lane would extend up to 25 feet into the median with fill up to 5 feet deep and extending up to 12 feet from the existing edge of paving. The additional lane would continue to Mid-City Motor World, where the lane would be dropped to two northbound lanes.

Modified Alternative 3A – Construct Half Signal, Additional Northbound Lane from Cole Avenue to Mid-City Motor World, and Modify Drainage from Jacobs Avenue to Airport Road

A half signal would be constructed at the Airport Road Intersection with Route 101. The half signal would operate such that northbound traffic would have signal control to allow for southbound left turns east to Airport Road/Jacobs Avenue, and westbound left turns from Airport Road/Jacobs Avenue to a southbound acceleration lane, where southbound mainline traffic would not be stopped. The Airport Road/Jacobs Avenue intersection would include a slight realignment of Jacobs Avenue to the east (within City of Eureka and County of Humboldt right-of-way), to accommodate a second northbound lane to allow immediate access for northbound traffic to enter Route 101 northbound. Stopping northbound Route 101 traffic with a signal also requires adding a third northbound lane to minimize queue lengths, shorter signal cycle times, and less potential for diversion to other routes. The third northbound lane would be added toward the median, and would extend from 400 feet south of the Airport Road Intersection to Mid-City Motor World for a total 3-lane segment length of 3,000 feet. This three lane section is required to ensure vehicles have adequate distance to merge to two lanes and an auxiliary right-turn-only lane at Mid-City Motor World.

Fifteen to twenty years following construction of the signal, the projected increase in traffic volume is expected to delay the westbound left turn movement from Airport Road/Jacobs Avenue approximately 120 seconds, which is LOS “F”. Consequently, in 15 to 20 years, the projected increased volume of traffic on Route 101 would require that the signal phase for the westbound left turn movement onto southbound Route 101 be abandoned or discontinued. This would result in the southbound left turn from Route 101 as the only allowed left turning move. Using traffic volumes projected to the year 2041, the delay for northbound traffic with this configuration is expected to be less than 30 seconds, providing an intersection LOS “C” for the project life.

A retaining wall (up to 4 feet high, 150 feet long) would likely be required to support the east edge of the realigned Jacobs Avenue without encroaching into private property. Modified Alternative 3A would also require realigning existing 150-feet-long by 4-feet-wide roadside drainage. The current drainage flows for approximately 50 feet through a culvert under Jacobs Avenue. The remaining 100 feet of the drainage is an open ditch along the Airport Road shoulder. Under Modified Alternative 3A, the 100-foot section of open ditch would be eliminated and realigned into a 130-foot-long, 24-inch diameter culvert.

To revise the drainage and construct the retaining wall, the order of construction work would be as follows:

- Trench and place new culvert across Jacobs Avenue, with traffic flaggers directing traffic through the intersection.
- With the new culvert in place and water flowing through it, the ditch adjacent to Jacobs Avenue would no longer carry water. Saturated soils from the ditch would be over-excavated by approximately 2 feet and hauled away in dump trucks. Place and compact structure foundation base material.
- Place forms and reinforcing steel for the approximate 4-feet-wide retaining wall footing in the excavation, pour concrete, and remove forms.
- Place forms and reinforcing steel for the 1-foot-thick retaining wall stem, pour concrete, and remove forms.
- Place imported borrow material to bring the road to sub-grade elevation of the retaining wall.
- Place forms and reinforcing steel to construct a concrete barrier, and then remove forms. (See Appendix A, Project Cross-Sections and Lay Outs.)

Clear Recovery Zone

For any one of the Build Alternatives, one mature Monterey cypress (*Cupressus macrocarpa*) antree and some shrubs would be removed that are currently too close to the edge of the Route 101 traveled way. Large trees and clumps of shrubs can pose potential hazards for errant vehicles or vehicles making emergency maneuvers. Removing or shielding fixed objects that are within 30 feet from the edge of the traveled way, known as the clear recovery zone, would enhance safety.

Alternatives Considered but Eliminated From Further Discussion (prior to and after Draft EIR/S)

Grade Separation Alternatives

Three different grade separation types had originally been studied for the Route 101/Indianola Cutoff grade separation: Alternative 2a - compact diamond grade separation; Alternative 2b - Single Point grade separation; and Alternative 2c - grade separation with roundabout intersection at Indianola Cutoff. Alternatives 2b and 2c were initially proposed prior to completing a preliminary traffic impact analysis. These unconventional grade separation types were suggested because of the assumed potential for high volumes of "U-turn" movements from Route 101 northbound to southbound and southbound to northbound. Upon completion of the traffic impact analyses, it was determined that a conventional compact diamond grade separation would operate with an LOS of "B" or better. Because Alternatives 2b and 2c would be more costly, would have a larger impact on wetlands, require realignment of the existing drainage ditch at Indianola Cutoff, require the acquisition of additional right-of-way, contribute to driver confusion (the non-standard grade separation configuration), and have no operational advantages over Alternative 2a, Alternatives 2b and 2c were dropped from further consideration.

Alternative 3A (unmodified)

The initial unmodified Alternative 3A was also designed after the circulation of the DEIR/S. It is similar to Alternative 3 except that the proposed grade separation at Indianola Cutoff was redesigned to reduce wetland impact. This alternative also includes a southbound left turn only signal at Airport Road which would completely avoid the County airport (Murray Field). Alternative 3A was designed to reduce wetland impact and enhance safety while providing the most effective bicycle access because the proposed grade separation would provide highway crossing midway between Eureka and Arcata at the busiest intersection.

Alternative 3A, along with Alternative 1A, was presented at a public meeting on December 3, 2008. Many of the comments received from the public again stressed tree preservation, public and non-motorized transit, climate change / sea level rise concerns, safety concerns about turnarounds in Alternative 1A, and safety concerns pertaining to a proposed signal at Route 101 and Airport Road.

However, HCAOG, the project sponsor, raised the concern that Alternative 3A would not accommodate left turns from Airport Road to southbound Route 101. Consequently, Caltrans modified Alternative 3A to include this move. (See the plan sheets in Appendix A showing the proposed modification at the Route 101/Airport Road intersection.) To allow left turn movements to southbound Route 101, intersection improvements would result in 0.5 acre of additional U.S. Army Corps of Engineers (USACE) wetland impact compared to the original Alternative 3A. The (original) Alternative 3A has been dropped from consideration since it does not accommodate left turn movements from Airport Road.

Alternative 4

Alternative 4 has the same features as Alternative 2, except that the median opening at the Airport Road intersection would remain open and non-signalized. This alternative was considered in an attempt to address concerns regarding access brought forth by residents along Jacobs Avenue and the 101 Corridor Access Project Group. (See Chapter 2, Section 2.2 for more information about this group). Because leaving the Airport Road median crossing open would continue to allow for left turn movements across Route 101 mainline and left merge movements, it would not meet the project safety, operational, or LOS criteria. Therefore, it was dropped from further consideration**.**

Safety Corridor Alternatives

The following two alternatives include the Safety Corridor elements in addition to other improvements.

Alternative 5. Alternative 5, also referred to as the "Safety Corridor as a long term solution", includes maintaining the elements of the present Safety Corridor and adding continual yearly funding for additional enforcement and education efforts. This alternative also includes the bridge improvements and long-term roadway rehabilitation elements of Alternative 1, but not closing the Route 101 median openings. In addition, Alternative 5 includes extending the existing acceleration and deceleration lanes for left turn movements at median openings (since median openings would not be closed).

Continual funding of additional enforcement would require an ongoing financial commitment by HCAOG, Caltrans Office of Traffic Safety Program, the State Office of Traffic Safety, or the California Transportation Commission with funding approvals by the State Legislature in many instances. The suggestion to maintain the Safety Corridor with enhanced traffic enforcement has been made to HCAOG. However, there are no means to provide long-term continuous financial assurances for additional enforcement and education.

Furthermore, on Route 101 between Eureka and Arcata, the average annual daily traffic is expected to increase from 37,000 vehicles per day in 2013 to 50,000 by 2041 and, as described in Chapter 1, could lead to higher collision rates. Consequently, Alternative 5 would not meet the project need and purpose for the following reasons:

- ***It does not meet the project need and purpose Safety Criterion***. Uncontrolled left turn movements across Route 101 medians would be allowed under Alternative 5. Based on past and current collision rate data, the higher percentage of fatal plus injury collisions than the State average would not be expected to improve since the key severe collision factor (uncontrolled left turn movements) would remain.

- ***It does not meet the need and purpose Operational Criterion***. The uncontrolled left turn movements across high volume Route 101 traffic result in operational conflicts. In addition, the reduced posted speed limit on Route 101 causes traffic increases on Route 255 and Old Arcata Road. As traffic volumes increase in future years, the risk for collision increases not only on Route 101 but also on Route 255 and Old Arcata Road.

- ***It does not meet the need and purpose LOS Criterion***. The LOS on Route 101 would degrade at intersections causing greater delays and therefore greater potential driver frustration and impatience. As stated previously, traffic volumes are expected to increase on Route 101; as this occurs, gaps between cars would become less frequent and shorter and it would become increasingly difficult to cross lanes and merge. This would lead to longer waiting periods for left turn and crossing movements and create greater delays at intersections, which in turn could lead to longer queuing at left turn lanes and affect the traffic on adjacent through lanes.

As previously described, the double fine zone legislation has expired, there is no extra enforcement, and there are no public education efforts currently underway for the Safety Corridor. Even if all components of the initial Safety Corridor were restored, additional roadway improvements would be necessary to meet the project need and purpose in order to improve safety over the long term. A review of safety corridors on other highways within the State has shown that their effectiveness is short-lived. Among the explanations given by traffic safety engineers for this loss of effectiveness is the phenomenon of habituation. That is why warning signs, which rely upon driver alertness and attentiveness, are not long term meaningful substitutes for permanent engineered structural improvements using the latest design standards. For the reasons listed above, and because traffic volumes and average speeds within the corridor are expected to increase, a long term constructed improvement solution is needed. If a long term project were not implemented, median closure would likely still be necessary as safety issues arise. Any remaining elements of the Safety Corridor would be removed after construction of the Route 101 corridor improvements discussed in this document.

This alternative would only meet the Roadway Rehabilitation Conformance Criterion, therefore does not meet the need and purpose and was dropped from further consideration.

As described above, Alternative 5 is slightly different than Alternative 7, the No-Build Alternative. The full Safety Corridor project included features that have since been removed: enhanced enforcement, education/public awareness campaigns, and double-fines for speeding. Under the No-Build Alternative scenario, the remaining Safety Corridor elements would remain until conditions warranted partial or entire removal.

Alternative 6. Alternative 6 includes elements of Alternatives 3 and 5. This alternative includes realignment and construction of a signal at Airport Road/Route 101 and constructing a third northbound lane from Cole Avenue to Mid-City Motor World. This alternative would not close or signalize any of the Route 101 median openings (except Airport Road); consequently, it does not meet three of the four project need and purpose conformance criteria:

- ***It does not meet the project need and purpose Safety Criterion***. Uncontrolled left turn movements across Route 101 medians would be allowed under Alternative 6. Based on past and current collision rate data, the higher percentage of fatal plus injury collisions than the State average would not be expected to improve since the key severe collision factor (uncontrolled left turn movements) would remain.

- ***Alternative 6 does not meet the Traffic Operational Criterion***. The left turn movements across Route 101 result in operational conflicts. In addition, the reduced posted speed limit on Route 101 causes traffic increases on Route 255 and Old Arcata Road.

- ***It does not meet the traffic LOS Criterion.*** The LOS on Route 101 would degrade at intersections causing greater delays and driver frustration.

This alternative would only meet the Roadway Rehabilitation Conformance Criterion and does not meet Safety Criterion for need and purpose, therefore was dropped from further consideration.

Route 101 "Signalized Boulevard" Alternative

In response to public comment, Caltrans evaluated a Route 101 "Signalized Boulevard" Alternative that would consist of signalizing all six Route 101 intersections (with open medians for crossing) between Eureka and Arcata. In addition, this alternative would require four northbound through travel lanes and three southbound through travel lanes. Single left turn lanes would be required at all intersections with dual left turn lanes being required for southbound Route 101 left turning traffic at the Indianola Cutoff intersection.

The Caltrans District 1 Office of Traffic Operations conducted an analysis of a Route 101"Signalized Boulevard" Alternative. *(Source: Caltrans District 1 Traffic Operational Response to Draft California Coastal Commission Staff Recommendation Document—Eureka-Arcata Corridor Project Memorandum, July 17, 2012*) The main findings are as follows:

- According to the *Fundamentals of Traffic Engineering, 14th Edition*, Institute of Transportation Studies of the University of California-Berkeley, 1996, Page 17-1, the disadvantages of signal installations are: "(1) Most installations increase total intersection delay and fuel consumption, especially during off-peak periods, (2) Probable increase in certain types of accidents (e.g., rear-end collisions), (3) When improperly located, cause unnecessary delay and promote disrespect for this type of control, and (4) When improperly timed, cause excessive delay, increasing driver irritation."

- A "Signalized Boulevard" Alternative would not substantially reduce the total number of traffic collisions and the broadside (right angle) collision concern would remain by signal control. Signalized intersections often cause an increase in rear end collisions, especially on the higher volume mainline street that likely did not have stop control prior to the signal installation. Broadside collisions are not eliminated at signalized intersections because travelers do not always obey the traffic signals or simply try to race through the intersection at the end of yellow time or early beginning of red time. Since broadside collisions involve more fatalities and injuries than other types of collisions, properly designed interchanges tend to experience far less severe injury and fatal collisions than signalized intersections due to the almost total elimination of the more severe broadside collisions.

- This alternative would not improve traffic flow in the corridor as it would actually cause an increase in congestion on Route 101 by introducing six new traffic signals and new cumulative travel delay to the corridor not currently experienced by drivers. Route 101 traffic (both regional and interregional) traveling through a signalized network could be forced to stop three or four times at red lights during peak travel times.

- According to the *Traffic Engineering Handbook, 6th Edition*, Institute of Transportation Engineers (ITE), 2009, Page 109: "Traffic characteristics at signalized intersections differ from those on freeways because they are greatly influenced by the periodic interruption of traffic signals. Such control…precipitates and governs the formation and discharge characteristics of queues…" While the corridor, which is categorized as an expressway, would not be categorized as a freeway once an interchange at Indianola Cutoff is constructed, it would continue to have several characteristics that are common to freeways. Freeways have the advantage of not having to stop mainline traffic. Drivers in the corridor currently enjoy this advantage, with the exception of mainline left turning vehicles that have to yield to opposing traffic before executing their maneuvers.

- Another major disadvantage to a "Signalized Boulevard" Alternative would be in facilitating pedestrian traffic across Route 101 traffic lanes. In the District 1 Traffic Operations modeling effort, it was assumed that pedestrians would be allowed to cross Route 101 mainline at the Indianola Cutoff intersection, with only one crosswalk crossing Route 101 allowed at the intersection. Under this scenario, mainline traffic delay was found to be greatly increased by each pedestrian call (push the pedestrian button) due to the large pedestrian crossing distance. Ideally, pedestrians would only cross one direction of Route 101 at a time, make an additional pedestrian call once in the median pedestrian refuge area for the crossing of the opposing mainline travel lanes, and then wait for the next pedestrian phase to occur to finish crossing the highway.

- Concerns would exist by having a raised pedestrian refuge in the Route 101 median because of the speeds on mainline Route 101. According to the *Highway Design Manual, Sixth Edition*, California Department of Transportation, Index 405.4 (2), "On facilities with speeds over 45 mph, the use of any type of curb is discouraged," meaning that a raised pedestrian island in the median would not be desirable.

- Pedestrians would be vulnerable to traffic without a raised pedestrian refuge island; this would force the need for a sufficiently long pedestrian signal phase (about 45 seconds) to ensure that pedestrians could cross both directions of mainline traffic, which would cause considerable delay to mainline traffic. (Based on a pedestrian walking speed of 3.5 feet per second as recommended by the *California Manual on Uniform Traffic Control Devices, 2012 Edition*, California Department of Transportation, Page 948, and required by the March 30, 2012 *Caltrans Traffic Operations Policy Directive 12-01*.)

- This alternative would require the filling of approximately 15 acres of wetland, which is more than any of the Build Alternatives. The wetland impact would result from the need for additional through and turning/acceleration/deceleration lanes to maintain LOS "C" performance at the signalized intersections.

- This alternative would have greater air pollution/greenhouse gas and energy consumption impacts compared to the existing non-signalized condition since a constant speed is more fuel efficient than stopping and accelerating. (See Chapter 4 for more information.)

- This alternative would very likely cause some diversion of a portion of the traffic on Route 101 to State Route 255 and Old Arcata Road since these two alternate routes between Eureka and Arcata are not signalized. Substantial traffic increases could adversely affect residential areas along State Route 255 and Old Arcata Road with increases in traffic related noise.

In conclusion, a “Signalized Boulevard” Alternative was dropped from consideration for the following reasons: (1) Additional lanes would be required to make the signalized intersections work at acceptable level of service which causes this alternative to have greater wetland impact than most of the alternatives identified in the project study report; (2) Not all of the intersections would be viable candidates for traffic signalization due to most not meeting traffic signal warrants; (3) Signalizing the corridor would introduce congestion and delay not currently experienced in the corridor, (4) Spacing between intersections does not allow for efficient traffic signal coordination, and (5) Signalizing the corridor would not remove the crossing conflicts at each intersection, which has led to numerous occurrences of broadside (right angle) collisions.

Full Signal at Indianola Cutoff Alternative

Two alternatives to signalize only Indianola Cutoff in lieu of a grade separation (interchange) were evaluated. The first alternative was designed with two additional Route 101 northbound lanes, one additional southbound Route 101 through lane, as well as additional multiple turning lanes in order for the intersection to operate at an acceptable level of service for the future projected traffic volumes over the next 20 years.

The first signalized alternative was dropped from consideration for the following reasons:

- Since there is a well documented, continuing safety problem at Indianola Cutoff, collision projections and existing poor performance of similar facilities prove that installing a traffic signal would not solve the problem. For total collisions per year, an interchange would have approximately 45 percent less collisions than a signalized intersection.

- Research studies document that signalization for isolated locations on high-speed rural expressways increases collision rates and creates problems rather than solving them.

- Even with additional collision reduction strategies, treatments, and countermeasures if a signal at Indianola Cutoff was added to the intersection, the safety performance would degrade.

Signalizing Indianola Cutoff is not a viable option for the Eureka-Arcata Corridor. Due to the high level of traffic volumes present in the corridor, a more advanced intersection treatment (e.g., an interchange) is required to adequately facilitate traffic through the corridor. For this very reason, a signalized alternative at Indianola Cutoff was eliminated from consideration years ago in the project development process. A traffic signal at Indianola Cutoff would immediately introduce added congestion to the Route 101 corridor between Eureka and Arcata even if additional lanes were provided to optimize the intersection’s signal performance. (Sources: Caltrans Traffic Safety Office Issue Paper: Safety Analysis of Signalization at Indianola Cutoff/Route 101, June 28, 2012; Caltrans Traffic Operations Traffic Analysis of Two Signal Corridor Scenario, June 14, 2013.

In order to minimize wetland impact, a second signalized alternative, consisting of only a signal at Indianola Cutoff without adding additional lanes, was evaluated. The Caltrans Traffic Operations unit made the following conclusions regarding this second signalization alternative:

- A signal alternative with no additional lanes at Indianola as proposed would fail in terms of unacceptable operational delay and recurring traffic queues.

- The likelihood of rear end collisions is increased when a signal is added to expressways in rural settings with high traffic volumes, such as the corridor.
- A signalized option would also fail to adequately protect bicyclists and pedestrians who use the facility, as there would be no grade or barrier separation.

- A signalized alternative would also likely cause some diversion of a portion of the traffic volume on Route 101 to State Route 255.

(Sources: Caltrans Traffic Safety Office Issue Paper: Safety Analysis of Signalization at Indianola Cutoff/Route 101, June 28, 2012; Caltrans Traffic Operations Traffic Analysis of Two Signal Corridor Scenario, June 14, 2013)

Roundabout with Full Signal at Airport Road Alternative

In September 2009, one or more of the local businesses on Jacobs Avenue proposed a modification to Alternative 3. The modification consisted of a roundabout at the intersection of Jacobs Avenue and Airport Road to accommodate a fully signalized intersection at Route 101 and Airport Road.

The configuration as suggested has the following concerns:

- The minimum diameter for a roundabout should be 130 feet to turn around a commercial truck.

- A full signal has much longer signal timing than Modified Alternative 3A with a half signal. Because of this, more southbound left turning vehicles would be queued. When released to enter Airport Road, these vehicles would be prohibited from turning left onto Airport Road because the queue would extend across the northbound lanes of Route 101. This would prevent northbound Route 101 mainline traffic from moving, as well as preventing left turns from Airport Road onto southbound Route 101.

- Because of the small diameter (including a 130 foot diameter), dual traffic lanes could not be accommodated within the roundabout to queue left turning traffic due to truck off-tracking (trucks potentially encroaching into the adjacent lane) within such a tight turning radius. The roundabout as suggested would also prevent the free right move to northbound Route 101 because of the stopped left turning vehicles on Jacobs Avenue.

Because it is not practical to design the roundabout element of this alternative to meet minimal highway design standards for safety and traffic operation for all types of vehicles (including commercial trucks), this alternative was dropped from further consideration.

Other Alternatives

The alternatives that were discussed during the initial project development and value analysis stages, which were eliminated due to non-conformance with the Alternatives Selection Criteria and/or the additional selection criteria, are listed in Table 2-3.

Table 2-3 Corridor Alternatives No Longer Considered

Alternative		Major Reasons for Dropping From Consideration		
		Meets Selection Criteria?	Meets Additional Selection Criteria? (See footnotes)	Concern
PSR-X1	Close all median crossings, widen shoulders, grade separation at Indianola, Eureka Slough bridge at 6th Street, east frontage road 6th Street to Bayside Cutoff, and west frontage road from the California Redwood Company to Bracut	Yes	No, c and e	Wetland impacts
PSR-X2	Close all median crossings, widen shoulders, grade separation at Indianola, Eureka Slough bridge at 6th Street, east frontage road 6th Street to Bracut, and west frontage road from California Redwood Company to Bracut	Yes	No, c and e	Wetland impacts

Table 2-3 Corridor Alternatives No Longer Considered				
Alternative		Major Reasons for Dropping From Consideration		
		Meets Selection Criteria?	Meets Additional Selection Criteria? (See footnotes)	Concern
PSR-X3	Close all median crossings, widen shoulders, grade separation at Indianola, overcrossing structure at Cole Avenue, reduce median width, and construct east frontage road 6th Street to Bracut, and west frontage road from the California Redwood Company to Bracut (no Eureka Slough bridge)	Yes	No, c and e	Wetland impacts
PSR-X4	Close all median crossings, widen shoulders, Eureka Slough bridge at 6th Street, grade separation at Indianola, California Redwood Company overcrossing structure, east frontage road 6th Street to Bracut, purchase Bracut Industrial Park for borrow site/wetland mitigation, and eliminate need for access	Yes	No, c and e	Wetland impacts
PSR-X5	Close all median crossings, widen shoulders, elevated structure from Mid-City Motor World to Bracut, Eureka Slough bridge at 6th Street, grade separation at Indianola, east frontage road 6th Street to Mid-City Motor World, frontage road under elevated highway from Mid-City Motor World to Bracut	Yes	No, c and e	Wetland impacts
PSR-Y1	Close all median crossings, widen shoulders, grade separation at Indianola, Eureka Slough bridge at 6th Street, extend acceleration and deceleration lanes at existing access locations	Yes	No, c and e	Wetland impacts
PSR-Y2	Close all median crossings, signal at Indianola with U-turns allowed, Eureka Slough bridge at 6th Street, extend acceleration and deceleration lanes at existing access locations, no frontage roads	No	Not applicable	Did not meet need and purpose
PSR-Y3	Close all median crossings, widen shoulders, extend acceleration and deceleration lanes at	Yes	Yes	Changed to Alt. 1 with shoulder

Table 2-3 Corridor Alternatives No Longer Considered				
Alternative		Major Reasons for Dropping From Consideration		
		Meets Selection Criteria?	Meets Additional Selection Criteria? (See footnotes)	Concern
	existing access locations, no grade separation at Indianola			widening removed
PSR-Y4	Close all median crossings, widen shoulders, diamond grade separation at Indianola, extend acceleration and deceleration lanes at existing access locations	Yes	Yes	Changed to Alt. 2 with shoulder widening removed
VA-2.1	Construct Eureka to Arcata frontage road with a 6th Street bridge over Eureka Slough	Yes	No, c and e	Wetland impacts
VA-2.2	Construct Eureka to Indianola Cutoff frontage road with a 6th Street bridge over Eureka Slough	Yes	No, c and e	Wetland impacts
VA-3.0	Implement Transportation System Management Measures and Expand Mass Transit to Maintain Existing Average Daily Traffic	No	Not Applicable	Did not meet need and purpose
VA-4.0	Use Pace Cars to Create Traffic Gaps	No	Not Applicable	Did not meet need and purpose
VA-6.1	PSR Alternative Y4 with a Flyover grade separation and roundabout on Indianola Cutoff	Yes	No, c and e	Wetland shading and visual impacts
VA-7.0	PSR Alternative Y4 with a Route 101 southbound Hook Ramp to Jacobs Avenue	Yes	No, c and e	Wetland and salt marsh impacts

Notes:

"c" indicates cost was in excess of PSR Alternative Y4

"e" indicates environmental impacts in excess of PSR Alternative Y4.

TSM and Public Transit Alternative (Value Analysis Alternative 3.0)

While VA Alternative 3.0 is described in Table 2-2, it is also worth describing in more detail as questions regarding implementing transit measures to address safety and operational improvements for Route 101 are routinely asked. Transportation System Management (TSM) measures are designed to reduce peak hour highway travel demand or improve the existing highway efficiency without constructing costly improvements or building new highway facilities. The Value Analysis Team (see Chapter 1 for more information about the Value Analysis process) discussed and studied a TSM idea (entitled RTC-6). Idea RTC-6 included the following TSM measures:

- Raise public traffic safety awareness on the Route 101 corridor; this has already been implemented with television announcements and traffic safety education at schools.
- Implement a toll road, expand public transit, and create incentives for car pooling/ridesharing;
- Provide incentives to encourage flexible work hours/schedules and telecommuting; and,
- Implement turning restrictions such as gates, signs, and times.

The Value Analysis team also looked at combining the above TSM measures with increasing traffic enforcement and substantially increasing traffic fines. These measures have already been implemented with the Safety Corridor discussed earlier in this chapter.

The VA team studied the idea of expanding the existing public bus fleets and facilities, and park-and-ride facilities over a period of 20 to 25 years, and intensifying the marketing of public transit over a five-year period for mass transit to be able to handle the projected 15,000 vehicle increase in average daily traffic (ADT) over the next thirty years.

This alternative would have positive effects of saving energy, improving air quality, reducing traffic volumes, and maintaining current aesthetics, biological, archaeological, and visual conditions. In addition, this alternative would allow for more efficient use of the existing Route 101 roadway since it could potentially maintain or increase the number of travelers on Route 101 without a major expansion of the roadway. However, this alternative requires increases in State funding, voluntary public participation as users of mass transit, and would have potential biological and environmental impacts where parking lots/structures are constructed and mass transit facilities are expanded. In addition, dispersed moderately low-density housing and employment patterns of Eureka and Arcata limit the ability to feasibly serve travel demand with buses. Expansion of public transit alone would cost approximately $90,000,000 more than the proposed Build 2 Alternative with a grade separation at Indianola Cutoff. The VA team did not study the idea of developing light rail public transit service, using the existing railroad facility between Eureka and Arcata, since such an option would likely be more costly than expanding the public bus system. Because of extremely high costs, Caltrans eliminated the public transit expansion feature of the TSM alternative from further study.

The TSM alternative would have the advantage of saving fuel, minimizing environmental impacts, and if implemented without expanding public transit, would be relatively inexpensive to implement. However, the predicted increase in future traffic within the Route 101 corridor is expected to nullify safety improvement benefits. Ultimately, the TSM Alternative would not fulfill the need and purpose for the project to effectively minimize traffic collisions and improve traffic operations at intersections along the Route 101 corridor.

Furthermore, transit alternatives have proven to be more viable choices for motorists when LOS, as well as parking, becomes a problem. The LOS for mainline Route 101 traffic is not projected to degrade below a LOS "D" for the year 2041; thus, it would be expected that most commuters would still choose driving a personal vehicle over public transit.

U Turn Alternative

Soon after the initiation of the project environmental studies, an alternative was generated by proponents who supported expanding what was then the Mill Yard business in Bracut. This alternative suggested that median openings could be closed and openings created in other locations to allow for U turn movements. This alternative, as proposed to Caltrans, would not have sufficient distance to safely complete weaving or lane transitions for U turns movements. However, specific considerations were addressed and Alternative 1A was developed which incorporates U turn movements. (See Chapter 2, Section 2.2 for a detailed description of Alternative 1A.)

2.4 Permits and Approvals Needed

Following circulation of the Final EIR/S, if the decision is made to approve the project, a Notice of Determination will be published for compliance with the California Environmental Quality Act (CEQA) and a Record of Decision published for compliance with the National Environmental Policy Act (NEPA).

Numerous federal and state environmental laws and regulations are applicable to this project and are identified and discussed in Chapter 3 of this document. By various mandates, the environmental notification, review, consultation, and coordination process with other agencies has included, and will continue to include, the following public agencies/ organizations:

- U.S. Fish and Wildlife Service
- California Office of Historic Preservation
- U.S. Environmental Protection Agency
- U.S. Army Corps of Engineers
- National Oceanic and Atmospheric Administration (NOAA) Fisheries
- U.S. Coast Guard
- California Department of Fish and Wildlife
- Humboldt Bay , Harbor, Recreation, and Conservation District
- California Regional Water Quality Control Board
- California Coastal Commission
- County of Humboldt
- City of Eureka
- City of Arcata
- Table Bluff Reservation Rancheria
- Blue Lake Rancheria
- Bear River Band of Rohnerville Rancheria

The following regulatory approvals, permits, agreements, and consultations from public agencies must be issued before construction can commence:

Section 404 Individual Permit. The U.S. Army Corps of Engineers (USACE) regulates the Nation's waterways and wetlands, and is responsible for implementing and enforcing Section 404 of the federal Clean Water Act (CWA). USACE regulations require that any activity that discharges material or requires excavation in waters of the United States, including wetlands, must obtain a Section 404 permit. An Individual Section 404 permit is required for activities with more substantial wetland impact potential. Implementation of the Corridor Improvement Project would result in the filling of wetlands and other waters of the United States. **Status:** *Submitted a preliminary permit application as part of the NEPA/404 integration process. See Appendix E for more information.*

Section 10 of the Rivers and Harbors Act Permit. This project would require a Section 10 permit from the USACE for the construction of any structure in or over any navigable water of the United States, the excavating from or depositing of material in such waters, or the accomplishment of any other work affecting the course, location, condition, or capacity of such waters. **Status:** *Coordination with USACE staff is ongoing. Permit application to be submitted following final environmental document approval, and prior to construction.*

Section 401 Water Quality Certification. The State Water Resources Control Board (SWRCB) and the Regional Water Quality Control Boards (RWQCB) promulgate and enforce narrative and numeric water quality standards in order to protect water quality and adopt and approve Water Quality Control Plans. The SWRCB and the RWQCBs also regulate discharges of harmful substances to surface waters, including wetlands, under the federal CWA and the California Porter-Cologne Water Quality Control Act (Porter-Cologne). If issuance of a Section 404 permit is required, it would be subject to water quality certification under CWA Section 401. **Status:** *Coordination with RWQCB staff is ongoing. Permit application to be submitted following final environmental document approval, and prior to construction.*

Federal Endangered Species Act (FESA). The primary federal law protecting threatened and endangered species is the Federal Endangered Species Act (FESA): 16 United States Code (USC), Section 1531, et seq. See also 50 CFR Part 402. This act, and subsequent amendments, provides for the conservation of endangered and threatened species and the ecosystems upon which they depend. Under Section 7 of this act, federal agencies, such as the Federal Highway Administration, are required to consult with the U.S. Fish and Wildlife Service (USFWS) and the National Oceanic and Atmospheric Administration - Fisheries (NOAA Fisheries) to ensure that they are not undertaking, funding, permitting or authorizing actions likely to jeopardize the continued existence of listed species or destroy or adversely modify designated critical habitat. Critical habitat is defined as geographic locations critical to the existence of a threatened or endangered species. The outcome of consultation under Section 7 is a Biological Opinion or an incidental take permit. Section 3 of FESA defines take as “harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect or any attempt at such conduct.” **Status:** *A Biological Opinion (BO) was issued on November 22, 2010 from the USFWS, which included measures to avoid and minimize harm to the tidewater goby during construction. The BO concludes that the proposed project is not likely to jeopardize the continued existence of the goby and is not likely to destroy or adversely modify critical habitat.*

NOAA Fisheries issued a Letter of Concurrence on April 29, 2016 which concluded the Federal Endangered Species Act consultation process. The letter concluded the proposed project may affect, but is not likely to adversely affect federally listed Southern Oregon/Northern California Coast (SONCC) coho salmon, California Coastal Chinook salmon, Northern California steelhead, Southern Distinct Population Segment of North American green sturgeon, or their designated critical habitats.

In addition, NOAA Fisheries concluded the potential project would adversely affect Essential Fish Habitat for Pacific Salmon (Chinook and coho), Pacific Groundfish, and Coastal Pelagic Species.

The USFWS BO and NOAA Fisheries Informal Consultation letter are located in Appendix I.

Essential Fish Habitat. The 1996 amendments to the Magnuson-Stevens Act set forth a number of new mandates for the National Oceanic and Atmospheric Administration (NOAA) Fisheries, eight regional fishery management councils (Councils), and other federal agencies to identify and protect important marine and anadromous fish habitat. The Councils, with assistance from NOAA Fisheries, are required to delineate Essential Fish Habitat (EFH) for all managed species. Federal agencies, which fund, permit, or carry out activities that may adversely impact EFH are required to consult with NOAA Fisheries regarding the potential effects of their actions on EFH, and are required to respond in writing to NOAA Fisheries recommendations. The proposed project is located within an area designated as EFH for Pacific Salmon. In addition to salmonids, species like flounder, perch, halibut, etc., in this estuarine area are included in EFH. However, technical assistance from NOAA Fisheries has determined only Pacific Salmon EFH would be affected by this action. **Status:** *NOAA Fisheries concluded the potential project would not adversely affect Essential Fish Habitat for Chinook and coho salmon.*

Section 106 Compliance. For projects with federal funding, the National Historic Preservation Act of 1966 (NHPA), as amended by 16 United States Code (USC) Section 470 et seq.; Section 106; 36 Code of Federal Regulations (CFR) 800, includes provisions for protection of significant archaeological and historical resources. Procedures for dealing with previously unsuspected cultural resources discovered during construction are identified in 36 CFR 800 (for implementing Section 106 processes). The administering agency is the State Historic Preservation Office (SHPO) and the Federal Highway Administration (working in cooperation with Caltrans). **Status:** *Section 106 process was finalized and a letter of concurrence from the SHPO was received November 29, 2006.*

Coastal Development Permits. Pursuant to the California Coastal Act of 1976, any proposed development within the Coastal Zone requires a Coastal Development Permit. The Coastal Act was established to protect public and private property, wildlife, marine fisheries, other ocean resources, and the natural environment. For this project, Coastal Development Permits would be required from the State and County of Humboldt, the City of Arcata, and the City of Eureka as this project lies within four Coastal Zone agency jurisdictions. However, Caltrans would likely request consolidating the permit jurisdictions and applying for one Coastal Development Permit from the California Coastal Commission. **Status:** *Coordination with California Coastal Commission staff is ongoing. Caltrans obtained Federal Coastal Consistency Certification on November 14, 2013. Permit application to be submitted following final environmental document approval, and prior to construction.*

General Bridge Act of 1946. This law requires the U.S. Coast Guard to approve the location and plans of bridges prior to start of construction (33 U.S.C. 525). **Status:** *Permit application to be submitted following final environmental document approval, and prior to construction.*

NPDES / Storm Water Pollution Prevention Plan (SWPPP) Permit. The National Pollutant Discharge Elimination System (NPDES) permit system was established in the Clean Water Act to regulate municipal and industrial discharges to surface Waters of the U.S. The statewide NPDES permit issued to Caltrans contains limits on allowable concentrations and mass emissions of pollutants contained in the discharge. Sections 401 and 402 of the CWA contain general requirements regarding the NPDES permit. **Status:** *The construction contractor working with Caltrans will submit a Notice of Intent to prepare a SWPPP after final project approval, and prior to construction.*

California Department of Fish and Wildlife. Section 1602 of the California Fish and Game Code requires a Streambed Alteration Agreement from the California Department of Fish and Wildlife (CDFW) for activities that would divert, obstruct or change the natural flow or adversely affect the bed, channel or bank of a stream and its associated fish and wildlife values, including contiguous riparian habitat. **Status:** *Coordination with Fish and Wildlife staff is ongoing. Permit application to be submitted following final environmental document approval, and prior to construction.*

Humboldt Bay Harbor Recreation and Conservation District. A permit from this agency is required for replacing the southbound Jacoby Creek bridge. **Status:** *Permit application to be submitted following final environmental document approval, and prior to construction.*

Other Permits and Agreements. Other permits and agreements, such as encroachment permits, from federal, state, and local agencies may be needed for implementation of project mitigation.

Chapter 3 Affected Environment, Environmental Consequences, and Avoidance, Minimization and/or Mitigation Measures

Introduction

The proposed project is a joint project by the California Department of Transportation (Department) and the Federal Highway Administration (FHWA) and is subject to state and federal environmental review requirements. Project documentation, therefore, has been prepared in compliance with both the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA). Some impacts determined to be significant under CEQA may not lead to a determination of significance under NEPA. Because NEPA is concerned with the significance of the project as a whole, quite often a “lower level” document is prepared for NEPA. This chapter discusses the magnitude of project impacts, while avoiding the determination of “significant” impacts. Refer to Chapter 4 – California Environmental Quality Act (CEQA) Evaluation for a discussion of potential significant project impacts in a CEQA context.

This chapter explains the effects that the five proposed project Build Alternatives would have on the human, physical, and biological environments in the project area. Note that Modified Alternative 3A is identified as the Preferred Alternative in Chapter 2, Section 2.3. The No-Build Alternative is included as the baseline for comparing environmental impacts.

Environmental topic areas are examined in the sections that follow. Each topic in this chapter starts with the applicable environmental regulations, followed by a description of the environmental setting, the potential for the proposed project to affect the environmental resource, and measures to avoid and minimize potential adverse effects that could result from the project. All resource areas were reviewed by technical experts to determine whether the technical reports needed to be updated. Technical reports and/or details within the text of the document were updated as needed.

Except where discussed, the No-Build Alternative (Alternative 7) would avoid environmental impacts or costs. However, even though the No-Build Alternative does not include any proposed roadway changes, traffic volumes and speeds are expected to increase in the foreseeable future which could necessitate closing one or more Route 101 median openings within the corridor for safety reasons. Closing one or more medians could potentially restrict access to businesses and residents, add out-of-direction travel and delay, increase fuel consumption, and adversely affect the Level of Service (LOS) of local streets as well as State Route 255.

Closing the medians would result in a situation similar to Alternative 1 in terms of access for businesses and residents and related transportation impacts. While generally avoiding any immediate impacts, the No-Build Alternative does not satisfy the project need and purpose.

Study Area Definition

The Route 101 project construction limits extend from the southern end of the Eureka Slough bridge (post mile 79.9) to the 11^{th} Street overcrossing in Arcata (post mile 86.3) to the north. The general environmental study limits for the project extend beyond the construction limits. The extent of the environmental setting area evaluated (the Study Area) may vary depending on the type of resources and locations where potential impacts would be expected. For example, potential traffic impacts resulting from the proposed project are assessed for the regional roadway network (including the community of Manila); whereas, potential project effects on floodplains are determined by the actual project construction limits only.

Environmental Analysis Baseline Condition and Study Timeframe

As stated previously, there are various environmental resources or topics in this chapter. Each topic has an affected environment section that describes the existing environmental condition. The existing or baseline conditions provide the basis for determining the environmental consequences. The No-Build Alternative essentially reflects the current existing conditions, which includes the Safety Corridor elements. However, it should be noted that the initiation of the Environmental Impact Report/Statement process started in 2001, which was prior to construction of the Safety Corridor. Because the Safety Corridor substantially changed the traffic conditions on Route 101 between Eureka and Arcata, and because overall traffic volumes and level of service have changed since 2001, the conditions at the time of traffic studies in 2005 were considered baseline conditions rather than conditions in 2001.

Certain environmental topics require evaluation of the project alternatives in the year 2041 while other topics do not. The year 2041 is approximately twenty years from the end of project construction. Environmental consequences related to traffic, air quality, noise, and energy are dynamic and based on the traffic volumes projected for the year 2041. These studies include a comparison of baseline conditions to projected year 2041 conditions.

Environmental consequences related to geology, hazardous waste, water quality, floodplain, cultural resources, visual resources, coastal resources, and biological resources are analyzed based on the location and extent of development that would result from project construction. A comparison of baseline conditions to year 2041 of the potential project effects for these topics is generally not relevant, thus not included.

As part of the scoping and environmental analysis conducted for the project, the following environmental issues were considered, but no adverse impacts were identified:

> ***Wild and Scenic Rivers.*** There are no State or Federal designated Wild and Scenic Rivers within the project study area.
>
> ***Mineral Resources.*** There are no known locally important mineral resource sites within the project area.
>
> ***Housing.*** The project would not displace housing. Temporary construction easements may need to be acquired depending on the alternative; however, these acquisitions, if needed, would not displace any existing housing or businesses. (For more information regarding easements, refer to Section 2.2 - Project Alternatives in Chapter 2.)

Consequently, there is no further discussion regarding these issues in this document.

This chapter summarizes the following technical studies on file at the Caltrans District 1 office in Eureka:

> Air Quality Study
> Archaeological Survey Report
> Community Impact Assessment
> Conceptual Wetland Mitigation Plan
> Energy Study
> Floodplain Evaluation Report
> Geotechnical Reports
> Hazardous Waste Studies
> Historic Property Survey Report
> Historic Resources Evaluation Report
> Natural Environment Study
> Natural Environment Study, Revised February 2015
> Noise Study
> Paleontological Resources Identification Report
> Right-of-Way Data Sheet (includes summary of utility involvement)
> Traffic Management Plan
> Traffic Studies
> Visual Impact Assessment
> Visual Impact Assessment Update
> Water Quality Study

Contact Sandra Rosas at 707-441-5730 to review these studies, except for the Archaeological Survey Report and Historic Property Survey Report, which contains confidential information.

3.1 Human Environment

3.1.1 Land Use, Community, Businesses

REGULATORY SETTING

The National Environmental Policy Act of 1969 (NEPA), as amended, established that the federal government use all practicable means to ensure for all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings [42 U.S.C. 4331(b)(2)]. The Federal Highway Administration in its implementation of NEPA [23 U.S.C. 109(h)] directs that final decisions regarding projects be made in the best overall public interest. This requires taking into account adverse environmental impacts, such as destruction or disruption of human-made resources, community cohesion, and the availability of public facilities and services.

Under the California Environmental Quality Act, an economic or social change by itself is not to be considered a significant effect on the environment. However, if a social or economic change is related to a physical change, then social or economic change may be considered in determining whether the physical change is significant. Since this project would result in physical change to the environment, it is appropriate to consider changes to community character and cohesion in assessing the significance of the project’s effects.

This project is in the Coastal Zone. The Coastal Zone Management Act of 1972 (CZMA) is the primary federal law enacted to preserve and protect coastal resources. The CZMA sets up a program under which coastal states are encouraged to develop coastal management programs. States with an approved coastal management plan are able to review federal permits and activities to determine if they are consistent with the state’s management plan. A Federal Consistency Certification from the California Coastal Commission was finalized on November 14, 2013 for the proposed project.

California has developed a Coastal Zone Management Plan and has enacted its own law, the California Coastal Act of 1976, to protect the coastline. The policies established by the California Coastal Act are similar to those for the CZMA. They include the protection and expansion of public access and recreation; the protection, enhancement and restoration of environmentally sensitive areas; protection of agricultural lands; the protection of scenic beauty; and the protection of property and life from coastal hazards. The California Coastal Commission is responsible for implementation and oversight under the California Coastal Act.

Just as the federal CZMA delegates power to coastal states to develop their own coastal management plans, the California Coastal Act delegates power to local governments (15 coastal counties and 58 cities) to enact their own local coastal programs (LCPs). LCPs determine the short- and long-term use of coastal resources in their jurisdiction consistent with the goals of the California Coastal Act.

AFFECTED ENVIRONMENT

Route 101 is the most important interregional route serving the northern California coastal area. It accommodates interstate traffic and connects North Coast communities with the San Francisco Bay Area to the south and the state of Oregon to the north. Route 101 is used heavily for intercity traffic between Humboldt County's two largest cities, Eureka and Arcata, and the surrounding communities. It also provides local access to a variety of large and small businesses adjacent to the Route 101 corridor, as well as to recreational opportunities along Humboldt Bay (including Arcata Bay). The Eureka-Arcata Route 101 Corridor is a relatively flat and straight section of coastal highway with Arcata Bay to the west and primarily agriculture and open space to the east. See Figures S-1, 2, and 3 for project maps in the summary and project Plan Sheets in Appendix A.

Various activities associated with Humboldt Bay directly and indirectly contribute to the local and regional economy. The northern portion of Humboldt Bay is often referred to as Arcata Bay, which is adjacent to the Eureka-Arcata Route 101 Corridor. Most commercial shipping and boating relates to forest products and fishing. Commercial fishing is a major industry and local seafood processors are closely tied to the fishing industry. Oyster cultivation, herring, and crab fishing are the major commercial fishing activities associated with Humboldt Bay.

Humboldt Bay is regionally important for recreational and commercial boating. Portions of Humboldt Bay are periodically deepened to allow large ships, including cruise ships, to enter the bay. Humboldt Bay is the only harbor for major shipping between San Francisco, California and Coos Bay, Oregon. Commercial marine transportation includes deep-draft shipping, barge traffic, and commercial fishing boats. There are several commercial ship docks and shipping-related facilities on the bay. The boat marina on Woodley Island is the largest all-season facility on Humboldt Bay and has docking facilities for approximately 300 pleasure and commercial fishing boats.

Since the railroad adjacent to Route 101 has not been in service for many years, Routes 101, 255, and 299 are the only existing continuous major north-south and west-east transportation links to the Humboldt Bay region.

Humboldt County encompasses approximately 2.3 million acres, 80 percent of which is forest lands, protected redwoods, and recreation areas. Population density is 35.4 persons per square mile, compared with an average of 217.2 persons per square mile statewide. *(Source: Redwood Region Economic Development Commission, 2000)* According to the 2010 U.S. Census, total population of the county is 134,623 which is an increase from 126,518 in 2000. The county's population is projected to grow to approximately 141,100 by 2020. *(Sources: U.S. Department of Commerce, Bureau of the Census, 2010 and Dyett & Bhatia, February 2002)*

Eureka and Arcata are the largest cities in Humboldt County, with Census 2010 populations of 27,191 and 17,231, respectively. Approximately one-third of the county's population resides in these two cities. In addition to incorporated cities, there are several unincorporated communities such as Bayside, Cutten, and McKinleyville surrounding Humboldt Bay. Approximately 60 percent of the county's population lives in the cities and unincorporated communities surrounding Humboldt Bay. *(Source: U.S. Department of Commerce, Bureau of the Census, 2010)*

The fastest growing communities in the county are McKinleyville and Fortuna: these communities grew by 12 percent and 15 percent between 2000 and 2010. (*Source: U.S. Department of Commerce, Bureau of the Census, 2010)*

REGIONAL EMPLOYMENT AND INCOME

Humboldt County has been making the transition from a resource extraction-based economy to a more diversified economy with stronger services and tourism. Over the past 20 to 30 years, the county sustained substantial job losses in the timber and commercial fishing industries because of changing environmental regulations and a variety of other factors.

Humboldt County experienced an economic recession reflecting the national and global economic downturn which began in 2007. The data in Table 3-1 below was compiled into a seasonally-adjusted Index that shows changes relative to the base month (January 1994). The composite Index is a weighted combination of six individual sectors of the local economy. The current Index is based on the most recently available data at the time (accessed September 2015).

Table 3-1 Composite Index

		Percent change from				
	Base Value**	Last Month	1 year Ago***	5 years Ago***	10 years Ago***
Index Composite*	105.6	-0.3	7.3	4.3	-5.5

*A composite of individual sectors of the local economy, including but not limited to the following: home sales, retail sales, employment, and manufacturing.

** This composite value was adjusted to remove seasonal fluctuation. The base month is January of 1994, with an Index value of 100.

*** The percent change from the same month one, five and ten years ago.

(Source: Humboldt Economic Index, September 2015)

Humboldt County's unemployment rate was 7.7% in 1990, 6.8% in 2000, 6.1% in 2005 and 11.2% in April 2011. These rates were often higher than the statewide unemployment rates which were 5.8%, 4.9%, 5.4%, and 11.9% respectively in those years. *(Sources: United States Department of Agriculture, Economic Research Service, 2006; California Employment Development Department, 2011)*

In Humboldt County, employment type comprises the following:

- Private wage or salary: 63%
- Government: 23%
- Self-employed, not incorporated: 13%
- Unpaid family work: 1%

(Source: City-Data, 2015)

Major employers in the city of Eureka include the State, County, and City agencies/governments, College of the Redwoods, public school districts, St. Joseph Health and California Redwood Company (Simpson). Major employers in the city of Arcata include Humboldt State University and Mad River Community Hospital.

Average annual pay data from the California Employment Development Department indicates the median household income was $39,627 in Humboldt County in 2008, compared with a median household income of $61,017 in the State of California in 2008.

The median household income in Humboldt County in April 2011 was $43,771. The median home sale cost for April 2011 was $225,000, which would require a minimum qualifying income of $48,019. *(Source: Humboldt Association of Realtors, 2015)*

BUSINESSES IN THE PROJECT VICINITY

Because Humboldt Bay, the railroad, and wetlands comprise the western border of Route 101, there are only a few businesses on the west side of Route 101 and south of the Route 101/255 interchange in Arcata. California Redwood Company, however, on the west side was the largest employer located along the corridor, with approximately 110 employees *(Source: Caltrans, February 2003)*, but it has closed this facility. There is a cluster of smaller businesses at the Bracut Industrial Park.

The majority of the businesses on the east side of the Route 101 corridor, and south of the Route 101/255 interchange in Arcata, are clustered along Jacobs Avenue which can currently be accessed from Route 101 at Cole Avenue (right turn in and out only) and at Airport Road. The Cole Avenue median opening was closed permanently in 2003, which eliminated left turn movements at this intersection.

There are about two dozen businesses located along the approximately three-quarter mile length of Jacobs Avenue to Airport Road. These include the following:

- Ayres Family Cremation
- Pacific Hoe, Saw & Knife Co. (Closed since Draft EIR/S circulated in 2007)
- Redwood Reliance Trailer Sales
- Bobcat West
- Eureka Oxygen Co.
- Peterbilt
- John’s Used Cars & Wreckers
- County of Humboldt Heavy Equipment Repair/Motor Pool Repair
- United Rentals
- U-Haul Rentals
- Happy Dog
- Applied Industrial Technologies (Closed since Draft EIR/S circulated in 2007)
- Gas Stoves with Style
- Rogers Machinery Co.
- Superior Alarms Inc.(Closed since Draft EIR/S circulated in 2006)
- Rainbow Self Storage
- Rick Harper Automotive
- WB Co.
- R & S Supply
- Lazy J Trailer Ranch (mobile home park)
- Carl Johnson Co.
- Johnson Ranches Farm Store
- Animal Emergency Center (Closed since Draft EIR/S circulated in 2007)

There are also businesses at the Murray Field, including the Northern Air/Cessna Pilot Center and a small café located in the terminal building.

Mid-City Motor World, a car dealership at post mile 81.34 and with direct access to Route 101, sells and services several makes and models of foreign and domestic cars.

At Indianola Cutoff, there are several large commercial properties, including a former movie theater. Businesses along the cutoff include Rainbow Self Storage, United Grocers Cash & Carry, and J’s RV Center. Coastline Foursquare Church is also at this location. Indianola Cutoff provides access to other businesses located less than one mile east of Route 101, along Indianola Cutoff, Indianola Road, Old Arcata Road, and Myrtle Avenue. These include the Humboldt Area Foundation Community Center, a body repair shop, mobile home park, and mini storage facility.

Bracut is the next Route 101 intersection north of Indianola Cutoff. On the east side of Route 101, KOA Drive provides access to the Redwood Coast Cabins and RV Resort (formerly KOA Campground), which has 158 RV and tent sites, 10 cabins and 2 cottages, as well as a convenience store for campground customers. Other businesses accessible from this Drive include Resale Lumber Products and a Caltrans Maintenance Station. The Bracut Industrial Park is on the other side of Route 101 and includes a bakery outlet, a trailer dealership, Green Future Soil Products, and Bayside Garden Supply.

BUSINESS SURVEY RESULTS

Caltrans Mail Survey

In January 2003, Caltrans and Mara Feeney & Associates prepared and distributed a survey to the businesses located in the project area, mainly along the Route 101 corridor, but also on nearby roads such as Indianola Cutoff and Old Arcata Road. A total of 58 businesses were identified through field investigations and research. A survey package was mailed to each of the 58 businesses, including a brief questionnaire, and a description of the project alternatives under consideration.

Of the 58 businesses surveyed, 20 returned completed survey forms, for a response of 34.5 percent. Nineteen of the twenty businesses that responded are in the immediate vicinity of the proposed project; one is on Old Arcata Road.

Survey results indicate that these businesses have had relatively long tenure at their locations along the Route 101 corridor. Only four of the businesses had been in place less than ten years, nine of them for over twenty years, and four had been at the same location for over 35 years. The newest business had been there for more than four years when this study was conducted, and the oldest for over fifty years. The size of the companies ranged from two employees to 110 employees, with a median of 10.5 employees (part-time employees were counted as 1/2 of full time).

The busiest times of day reported for these businesses varied widely; several reported being “constantly” busy. Others reported a range of busy periods throughout the day, with the most busy times clustering in the 8:00 to 9:00 AM and 4:00 to 5:00 PM time periods on week days.

Less variation was reported for the busiest season. Only one business reported winter as their busiest season. For the majority of businesses, summer was reported to be the busiest season, although for some companies their busy season began in spring and/or stretched into fall.

In response to the question about hours of operation, the majority of business respondents said their hours were 8 AM to 5 PM, although several opened somewhat earlier or later. Two businesses reported they operate 24 hours per day; and one reported that it operates 24 hours on weekend days only.

When asked why they had chosen to locate their businesses in their current location, the most frequent answers given were related to the location between the cities of Eureka and Arcata and adjacent to the Route 101 corridor:

- Central location between Eureka and Arcata – 4
- Convenient location – 3
- Easy access to Route 101 – 3
- Good location with highway frontage – 2

Other reasons named included:

- Reasonable cost – 2
- Large lot size – 2
- Natural beauty – 1

In response to being asked what percentage of their customers are from Eureka, Arcata, Samoa/Manila, or other areas, the most frequently given response was that approximately half of the customers come from Eureka and half from Arcata. As one respondent noted: “We are midway between Eureka and Arcata and also the midway point of the county.” Estimates for percentage of customers from Eureka ranged from 0 to 75 percent, with about three-fourths of all responses in the 40 to 60 percent range. Estimates for percentage of customers from Arcata ranged from 0 to 70 percent, with about one-third of responses in the 10 to 35 percent range and one-third in the 40 to 60 percent range. Estimates for percentage of customers from Samoa/Manila ranged from 0 to 15 percent, with more than 60 percent of the respondents saying they had no customers from that area. Estimates of the percentage of customers coming from “other” areas ranged from 0 to 100 percent, with one-half of all respondents saying they had no customers outside the area while one-third said that 10 to 25 percent of their customers came from outside the area. Only two businesses reported having over half of their customers coming from “other” areas. Businesses with a substantial percentage of customers from “other” areas were typically referring to communities in Humboldt County such as McKinleyville, Fortuna and outlying areas. One business owner noted that customers come from as far south as Ukiah and as far north as Oregon because “we handle items no others have.”

Public Meetings

Caltrans held a project Open House in Eureka on May 15, 2003 which was attended by many area residents, as well as representatives of some of the business and property owners in the Route 101 corridor. Some of the business owners expressed concern about the potential closure of median openings along Route 101 and the effect this could have on their business, income, and property values. Others expressed the view that the project was essential for safety. Owners of businesses that provide one-of-a-kind merchandise, have few competitors in the area, and/or have a loyal customer base expressed the view that their businesses would not be affected by any of the project alternatives. Other business owners stated that increased travel times and out-of-direction travel would drive many of their customers to competitors and possibly substantially damage their business.

On August 7, 2007, Caltrans, HCAOG, and FHWA held a public hearing at the Adorni Center in Eureka to provide the public an opportunity to review project information, including the results from the Draft EIR/S, and submit comments. Eighty-seven people signed the meeting attendance sheets. Many comments were submitted stressing the importance of access for businesses, customers, and residents.

In response to comments, Caltrans staff modified two of the existing alternatives to avoid adverse effects: Alternative 1A and Modified Alternative 3A. These two alternatives were presented to the public at a December 3, 2008 open house at the Wharfinger Building in Eureka. Many comments were submitted stressing the importance of access for businesses, customers, and residents.

For more information regarding public meetings, refer to Chapter 5 of this document. Copies of all written public comments are included in Volumes III and IV of the Final Environmental Impact Report/Statement.

Corridor Access Project (CAP) Business Survey

Shortly after the May 2003 Open House, a group composed primarily of owners of businesses on Route 101 between Eureka and Arcata formed an organization, the Corridor Access Project (CAP), to express their business concerns regarding the project. CAP hired a consultant to gather information on business activity in the corridor and the perceptions of business owners about the effects that closing median crossings would have on their businesses. In addition, the CAP consultant conducted an Options/Alternatives survey, which was sent to 29 business owners.

CAP's findings are that the 29 businesses surveyed in the Route 101 corridor employ a total of more than 480 employees with an annual payroll of almost $15 million. Gross annual sales were estimated at $131.7 million. Total sales tax generated were estimated at almost $6 million, with approximately $765,000 of this sales tax generated for the City of Eureka. Assessed value of property and improvements for the 29 businesses was estimated at $29.3 million and annual property taxes at $316,000.

The CAP group met numerous times after June 2003, indicating a high degree of concern about the proposed project among some of the potentially affected business owners. In addition, the CAP group presented their survey findings and position statement to representatives of HCAOG, City of Eureka, City of Arcata, County of Humboldt, and Caltrans to ensure their information, concerns and perceptions would be considered in the project decision-making process. The group believed that the Safety Corridor program had been effective in addressing safety concerns, although some thought that the acceleration/deceleration lanes along the corridor should be improved and traffic signalization should be added at Airport Road and at Mid-City Motor World. They supported construction of a grade separation at Indianola, but opposed any median closures, at least until impacts of access restrictions to businesses could be mitigated through construction of frontage roads to reduce out-of-direction travel and improve safety. Subsequently, the CAP group expressed support for a project that would include signalization at Airport Road and a grade separation at Indianola Cutoff, with continuation of reduced speeds, at least in the vicinity of the new signal. *(Source: Shreve Personal communication, 2006)*

LAND USE

Existing Land Use Patterns

Generalized land classification in the project vicinity is shown in Figure 3-1. The project extends from Eureka to Arcata through rural lands that include wildlife refuges, farmed wetlands, grazing pastures, and some relatively small pockets of commercial and industrial use. Much of the agricultural land around Humboldt Bay consists of former tidelands that were diked and reclaimed around the turn of the 20th century. North of the Route 101/255 interchange in Arcata, the land use changes to an urban mixed-use setting.

Humboldt Bay (which includes Arcata Bay) lies to the west of the Route 101 corridor and adjacent to wetlands, wildlife refuges and sanctuaries, and a (currently unused) railroad line that parallels Route 101. There are two industrial properties on the west side of the Route 101 Safety Corridor (50 mph segment)—California Redwood Company and the Bracut Industrial Park. Current recreation access points to Humboldt Bay and Arcata Bay in the project vicinity include a boat landing on Eureka Slough, as well as boat landings and hiking trails at both the Arcata Marsh and Wildlife Sanctuary and the Mad River Slough Wildlife Area.

The east side of Route 101 is a mixture of agricultural/open spaces, with limited sites for commercial/industrial uses, most of which are concentrated along Jacobs Avenue and Indianola Cutoff in the city of Eureka (as described in section 2.2.2). A California Department of Fish and Wildlife Refuge surrounds Murray Field Airport and Mid-City Motor World. KOA Drive at Bracut provides Route 101 access, not only to the campground but also to a Caltrans maintenance station and several commercial properties.

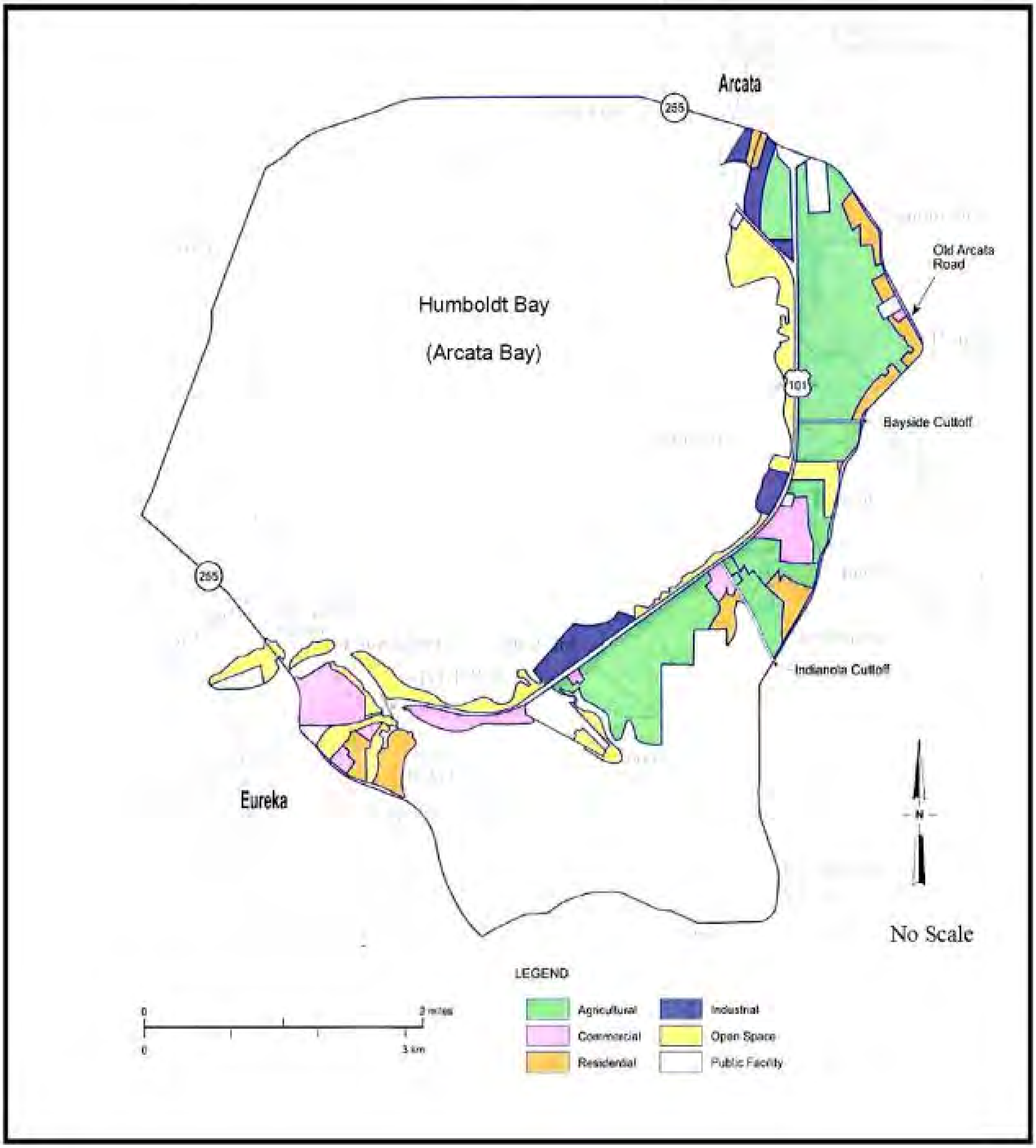


Figure 3-1 Land Use Map

Public Recreation

Humboldt Bay (includes Arcata Bay) lies to the west of the Route 101 corridor and is adjacent to wetlands, wildlife refuges and sanctuaries, and a (currently unused) railroad line that parallels Route 101. Current recreation activities, such as hunting, are allowed in the Humboldt Bay National Wildlife Refuge on the west side of Route 101 and in the State wildlife area on the east side of Route 101. Hiking opportunities and wildlife observation are popular at the Arcata Marsh and Wildlife Sanctuary at the north end of the corridor. There are also public sports fields on both sides of the Route 101/255 interchange in Arcata. Rotary Park on South G Street is within one-half mile of the Route 101/255 interchange in Arcata.

Existing Development

There are two industrial properties on the west side of the expressway—California Redwood Company and Bracut Industrial Park. On the east side of Route 101 is a mixture of agricultural/open spaces, with limited sites for commercial/industrial uses, most of which are concentrated along Jacobs Avenue and Indianola Cutoff in Eureka (as described in section 2.2.2). A California Department of Fish and Wildlife Refuge surrounds Murray Field Airport and Mid-City Motor World on the east side of Route 101. KOA Drive at Bracut provides Route 101 access, not only to the campground, but also to a Caltrans maintenance station and several commercial properties.

There is very limited residential development along the Route 101 corridor including a few scattered ranch homes, the Lazy J Trailer Ranch, and the Redwood Coast Cabins and RV Resort (formerly KOA campground), which at the time of a 2004 survey included some semi-permanent residents. Indianola Cutoff and Bayside Cutoff provide access to unincorporated communities and rural residential areas located approximately one mile east of the corridor.

Land Use Designations

Land along the project corridor lies within three jurisdictions: the City of Eureka, the City of Arcata, and the County of Humboldt. The City of Eureka's jurisdiction extends northeast along Route 101 to the vicinity of Indianola Cutoff. The City of Arcata extends south to approximately 1,000 feet south of Bayside Cutoff. The remaining area between the two cities lies in unincorporated Humboldt County.

Land within the jurisdiction of the City of Eureka on the west side of Route 101 is designated "Natural Resources" from Eureka Slough to the California Redwood Company property, which is designated General Industrial. On the east side of Route 101, the land along Jacobs Road is designated General Services Commercial. Murray Field is designated Public/Quasi-Public, and there is a small area adjacent to the airport designated Natural Resources, beyond which is Agricultural land.

The Agricultural land use designation extends from Murray Field Airport to Indianola Cutoff, with the exception of Mid-City Motor World and a relatively small area on the south side of Indianola Cutoff (both designated General Service Commercial), and a parcel of land at the intersection of Indianola Road and Walker Point Road designated Estate Residential.

Humboldt County land use designations along the corridor include Natural Resource in the wetland areas, Manufacturing at Bracut Industrial Park, and Agriculture Exclusive along the east side of the corridor. Land along the corridor that is located within the city limits of Arcata is designated primarily Agriculture Exclusive for the preservation of agricultural uses, or Natural Resource for the protection of public and private lands with unique or sensitive resources. North of the Route 101/255 interchange in Arcata, the land use is Mixed Use within an urban setting.

Development Trends and Planned Land Use

Population growth in Humboldt County has occurred at a rate considerably slower than the State of California's growth rate over the past two decades. Projections indicate continued relatively slow growth over the next twenty to thirty years. According to the 2010 U.S. Census, total population of the county is 134,623, which is an increase from 126,518 in 2000. The county's population is projected to grow to approximately 141,100 by 2020. *(Sources: U.S. Department of Commerce, Bureau of the Census, 2010, and Dyett & Bhatia, February 2002)* Because the city of Eureka is almost completely built out, the population is not expected to grow within the city limits. The majority of recent development in the Eureka area has occurred outside the city limits, and the population of this surrounding unincorporated area now is nearly equal to that of the city proper.

Further development is expected to occur, primarily in the unincorporated neighborhoods surrounding Eureka. Principal growth areas would continue to be the cities of Fortuna and Arcata, as well as the unincorporated communities of McKinleyville and Garberville, where adequate services exist to accommodate the anticipated population growth. *(Sources: Humboldt County, 1998; Redwood Region Economic Development Commission, 2000.)*

Land uses along the Route 101 corridor have remained relatively stable over the past decade. Further development along the Route 101 corridor is restricted by local land use policies and zoning constraints, as well as insufficient infrastructure and services. Governing jurisdictions have policies and zoning controls in place to protect the natural resource areas, open space, and agricultural uses along the corridor. For these reasons, it appears unlikely that local policy changes or demand for commercial or industrial development would result in changes in the intensity or types of uses found along the Route 101 corridor in the foreseeable future.

During the preparation of this document, major local projects in the planning phase included:

> ***Humboldt Bay Trail.*** The Humboldt County Association of Governments prepared the *Humboldt County 2012 Regional Bicycle Plan*, which includes a proposed non-motorized transit trail along the east side of Humboldt Bay. The proposed alignment would follow the existing North Coast Railroad bed (parallel and west of the existing Route 101 roadway). The City of Arcata is currently preparing to construct a trail from Arcata to Bracut between the bay and Route 101. The County of Humboldt is planning a trail to link with the Arcata trail at Bracut extending south to X Street in Eureka.
>
> ***Humboldt County Housing Element Implementation.*** The County of Humboldt Planning and Building Division is planning to rezone up to 75 properties countywide to meet future affordable housing needs.
>
> ***Marina Center.*** The Marina Center is a proposed mixed use development about two miles south of the proposed project on a 34-acre undeveloped plot known as the Balloon Tract in the city of Eureka.
>
> ***Samoa Town Master Plan.*** This development would include upgrading the existing town, including some of the existing infrastructure, and developing a 40-room hotel and maritime museum. The town would add 293 residential units with 22 vacation rentals, a new indoor soccer arena, and 47 acres of public parks, open space and wetlands.

ADOPTED LOCAL PLANS AND POLICIES

This section describes pertinent plans and policies that have been adopted by the County of Humboldt and the cities of Eureka and Arcata to guide land use and development decisions. In addition, pertinent policies contained in HCAOG's Regional Transportation Plan are reviewed below.

Land in the study area also lies within the Coastal Zone, where the California Coastal Commission regulates land use. Development activities within this zone require both local permits (from the city or county) and a State Coastal Development Permit to ensure the project complies with the policies of the California Coastal Act. This Act requires each jurisdiction within the Coastal Zone to develop a Local Coastal Program (LCP) consistent with the Act and to guide development. Eureka, Arcata, and the County of Humboldt have incorporated the required LCP elements into their General Plans, which guide land use within the project limits.

Humboldt County

Humboldt County's General Plan was last updated in 1984; however, the County launched a comprehensive General Plan update process in 2000. Since then, the County has been engaged in gathering data, examining the changes that have occurred over the past two decades, and developing projections to the year 2025 in order to plan for future population changes and associated community development needs in the unincorporated areas of Humboldt County.

Existing policies in the 1984 General Plan (Volume 1 Framework Plan) are aimed at delineating urban and rural areas so that growth can be directed to the urban areas where services are available and away from agricultural areas, open space, and timberlands. The General Plan states that development adjacent to agricultural land should be compatible with agriculture.

The 1984 General Plan also contains policies aimed at accommodating growth in the county in an orderly manner, through identification of spheres of influence and urban expansion areas where sufficient public services exist. The Plan encourages development of land not suitable for resource development before urban development is permitted on resource lands. The Plan states:

> Factors such as public water and sewer availability, road and street capacity, police and fire protection, proximity to educational and health facilities, and solid waste management should be assessed in urban development proposals.

Agricultural land uses are protected through General Plan policies such as the following:

> Extension of services such as sewer, water and roads should avoid traversing agricultural lands. Where infrastructure must cross agricultural lands, they should be located in public right-of-way and provide a LOS consistent with the development density reflected in the Land Use Plan.

The General Plan states a County goal, "to develop, operate and maintain a well-coordinated, balanced, circulation system that is safe, efficient and provides good access to all cities, communities, neighborhoods, recreational facilities and adjoining regions" (Goal 4220). One of the specific policies under this goal states that "significant increases in traffic volumes and turning movements on and off a major expressway/freeway at high volume at-grade intersections should be discouraged" (Policy 4231.3). The Plan supports development of an integrated transportation system based on land use and one that accommodates bicycles and transit, as well as automobiles (Policy 4237.4).

A working paper developed in 2002 as part of the County's General Plan update process, "Building Communities," includes a number of draft policy statements concerning the importance of transitional or buffer areas between urban and rural land uses. It underscores the need to balance open space and preservation of agricultural land with economic development and job creation in the coming decades. *(Source: Dyett & Bhatia, February 2002)*

The Murray Field Airport Master Plan Report (2006 public review draft), prepared for the County of Humboldt Department of Public Works Aviation Division, includes future airport improvements.

City of Eureka

The City of Eureka General Plan Policy Document (adopted in February 2002) contains adopted goals, policies, and objectives. The City aims to promote commercial and residential development that "takes advantage of existing facilities and services, while discouraging sprawling strip commercial development." *(Source: City of Eureka, 1997)*

The City's General Plan identifies Broadway (Route 101 within the southern half of the city) as Eureka's longest-standing and most difficult traffic problem. The Plan proposes several alternatives to address this problem—from realigning Route 101 and providing better signage to constructing a bypass. *(Source: City of Eureka, 1997)*

The City's General Plan contains a number of land use and community design policies aimed at preventing urban sprawl:

- The City shall discourage new development within the city that will adversely affect the economic vitality of the Core Area. The City shall also encourage Humboldt County to discourage such development in adjacent unincorporated areas" (Policy 1.L1).

- The City shall discourage isolated and sprawling commercial activities along major roads and instead reinforce the vitality of the Core Area and existing community and neighborhood shopping areas (Policy 1.L.3).

A similar prohibition is contained in City Ordinance 156.055, Public Works Standards, which states that “There shall be no extension of urban services (sewer and water) beyond the urban limit line as designated in the Local Coastal Program, except that the water system connecting line in the southwestern part of the city shall be permitted to extend outside the urban limit line, provided no connections for private users shall be allowed outside the urban limit line.” *(Source: City of Eureka, 1997)*

Eureka’s General Plan also includes policies that pertain to integrating facilities for bicycle users. Policy 3.C.7 states that, wherever possible, bikeways should be located on exclusive paths that are physically separated from automobiles, maximizing the use of streets with low vehicular traffic levels.

City of Arcata

The City of Arcata’s General Plan 2020 states that “Arcata’s environmentally conscious development guidelines, and surrounding permanent greenbelt, promote compact growth and resist the pressures for unplanned sprawl.” The General Plan expresses a commitment to open space and agricultural land preservation, and alternative transportation and energy use. It promotes the use of the least polluting, most efficient transportation means and encourages multi-modal transportation. *(Source: City of Arcata, 2000)*

Land Use Policy LU-6e states that lands designated Agriculture Exclusive (A-E) and Natural Resource (NR) are important components of Arcata’s open space plan, as defined in the Open Space Element. Policy LU-6e promotes the conservation and management of these lands for their natural resource values, as well as their biological, hydrological and soil resources. The Plan states that conversion of these lands to other non-compatible uses shall be prohibited. *(Source: City of Arcata, 2000)*

Arcata’s General Plan expresses support for travel demand management and a balanced transportation system with a choice of travel modes. Specific transportation policies include the following:

- ***T-1c Intercity travel.*** The City shall coordinate with the County of Humboldt and Caltrans to provide adequate facilities for vehicles, buses, and bicycles to serve intercity demand. Joint efforts may include transportation improvements outside of Arcata which serve intercity travel such as bicycle links, timed-transfer bus stops, park-and-ride lots, regional transit service, and development of park-and-ride lots in Arcata to reduce intercity vehicular travel.

- ***T-1d Critical transportation facilities.*** Critical transportation facilities for emergency vehicle access and emergency evacuation shall be maintained and improved as a priority need. Critical transportation facilities include the major routes into and out of the city such as Routes 101, 299, and 255, their interchanges with City streets and primary intra-city street connections.

- ***T-4a Freeways and Highways.*** Routes 101 and 299 are designated as freeways for their entire length in the city. State Route 255 is designated as both an arterial and a highway within the city. The following standards shall apply to these classifications:

    1. **Function.** Freeways function to provide for high-speed automobile and freight movement for intercity and regional travel.

    2. **Interchange improvements.** The City supports interchange improvements that reduce potential conflicts created by unrestricted access from freeway off-ramps.

Humboldt County Association of Governments (HCAOG)

HCAOG is the Regional Transportation Planning Agency for Humboldt County and a sponsor of the proposed project. HCAOG's main policy documents are the 2008 Regional Transportation Plan (RTP) and the RTP 2014 Update, which were prepared in cooperation with Caltrans, local transportation agencies, and transit authorities. Opportunities for public participation were also provided during the RTP process. The RTP identifies strategies aimed at promoting efficient connections between the regional transportation network and future planned land uses. Policies contained in the RTP include:

- Provide travel mode options so that people have the choice to travel independently on the mode that fits their needs. These choices not only involve the automobile, but also alternative modes such as airplane, bus transit, walking, biking, and telecommuting.

- Support regional multi-modal travel on major routes that connect major activity destinations. The transportation system should provide access from local areas to regional activities in centers such as Eureka, Arcata, Fortuna, and McKinleyville.

- The RTP promotes multi-modal travel, with pedestrian and bicycle accessibility to transit and other destinations.

The Route101 Eureka-Arcata Corridor Improvement is included in the list of top priority Regional Complete Streets Projects in the RTP 2014 Update. In addition, Policy 1.03 in the RTP is to "support safety improvements on highways, roadways, and streets in the HCAOG region."

Another policy (1.06) is to promote at-grade intersection improvements, including those on State Routes where Caltrans would be the lead agency responsible for making the improvements. The RTP and RTP 2014 Update encourage the development of alternative modes of travel (including transit and bicycling) to provide choice and reduce automobile congestion. For additional bicycle and pedestrian discussion, see Chapter 3, Section 3.1.6—Traffic and Transportation.

ENVIRONMENTAL CONSEQUENCES

Economic Consequences

Employment and Local Purchasing during Construction

The construction of Route 101 corridor improvements proposed by any one of the Build Alternatives would generate local income and tax revenues through construction payroll spending and local purchasing of construction materials such as fill, concrete, aggregate and asphalt. Alternative 7 (No-Build Alternative) would have no immediate impact on local employment, income, or local purchasing of construction materials. However, over time, it is possible that increased traffic congestion and collisions at Route 101 intersections could lengthen commute times and discourage customers from patronizing businesses located along the corridor.

Potential Impact on Local Business Patronage

Closing of median openings under any of the Build Alternatives would reduce operational conflicts and improve circulation along the Route 101 corridor, but would make access to existing businesses and homes along the corridor less convenient, possibly discouraging some customers from patronizing businesses, with resultant potential net losses in business income and jobs. (See Chapter 3, Section 3.1.6—Traffic and Transportation for a discussion of out-of-direction travel and associated travel delay.) The next section addresses the potential income and employment impacts of the median closings on local businesses (access to homes along the corridor is addressed in Chapter 3, Section 3.1.4). Businesses south and north of the project limits would not be substantially affected by the access restrictions (closed Route 101 medians).

Economic Effects of Restricting Access to Businesses

The profitability of any particular business is influenced by many factors. These include the robustness of the regional and national economy, the number and location of competitors (including the internet), the location of major population and employment centers, proximity to other businesses that draw customers, and changes in zoning or local policies that can affect community land use patterns.

Many studies have been conducted on the impacts of roadway modifications that can result in changes in access to local businesses. (Refer to Chapter 9 for a list of studies and research reports.) Even though the majority of these studies focus on construction of bypasses and freeway ramp closures, the studies were reviewed to obtain information about the type and magnitude of economic impacts associated with these relatively extreme forms of access restriction to local businesses, and as an indication of the nature of impacts that might occur as a result of a less extreme form of access restriction such as closing the median openings and restricting left turn movements, as is proposed under all Build Alternatives.

Many of the studies reviewed caution against extrapolating findings from one case study to another project since the situation of any particular business and the characteristics of other roadway improvement projects are unique. While study findings ranged widely, some generalizations can be made from them. For example, the literature suggests that once a bypass diverts traffic away from these businesses, those businesses that cater primarily to through traffic may suffer financially more than those serving local needs,. Other general findings include the following *(Source: Caltrans Standard Environmental Reference, 2011)*:

- The size of the community can influence the intensity of impacts from bypasses on roadside businesses (generally the larger the population base, the less the impact);
- The effects of a bypass on towns with tourist-based or service-oriented economies may be less than on other towns;
- A bypass that diverts traffic approximately one mile or less away from existing businesses would cause less of a drop in sales volume than one built more than a mile away (travelers seem willing to drive one mile out of the way even for convenience items such as gas and food); and
- Some highway-oriented businesses are able to overcome revenue losses through creative means such as expanding advertising to attract more local customers or adjusting products or services to cater more to local needs.

The National Cooperative Highway Research Program published a Research Results Digest specifically on the subject of left turn restrictions (as opposed to bypasses or ramp closures) on local businesses. *(Source: Weisbrod and Neuwirth, 1998)* This report states:

> Restriction of left turn access, particularly in heavily traveled commercial areas, has long caused friction between businesses and traffic engineers. Issues of customer access to local establishments often clash with the desire to reduce opportunities for collisions, improve speed and flow for through traffic, and reduce neighborhood traffic…Much of the protest results from the belief by business and property owners that traffic volumes and accessibility can affect the prospect for business sales and profits…Streets and highway systems have always served two functions—the movement of traffic and the service of land. At one

> end of the spectrum, local streets are planned to service land use almost to the exclusion of traffic movement. At the other end, freeways are designed to move traffic while providing virtually no service to abutting land. Intermediate roadway types usually serve both functions and the varying demands of each can create competition and conflict.

Based on a review of case studies, collection of business sales and other economic data before and after left turn restrictions were implemented, as well as customer surveys, the report noted that while some highway bypass studies indicate a relationship between loss of access and changes in business sales, this is not necessarily the case when access to businesses is altered but the businesses remain visible from the roadway. Several studies indicated that changes in access which result in longer travel times could affect shopping mall and grocery store sales, due to changes in travel patterns and the relative availability of competing businesses.

The report goes on to say that changes in access can affect some types of local businesses, particularly those that have substantial local competition, but that it does not affect others, making it difficult to generalize findings.

> Overall, findings on the effects of left turn restrictions on businesses have been mixed and widely varied. For cases where businesses were surveyed, some experienced losses, some experienced gains, and some had no change…there is also evidence that effects depend on the extent to which businesses rely on 'pass-by' traffic versus those that are 'destination-oriented'.

The types of businesses that depend the most on pass-by traffic include restaurants (especially "fast food"), cocktail lounges, motels, gas stations, and convenience stores. Businesses that are typically not traffic-dependent include industrial facilities, appliance repair, new auto sales, and veterinary businesses. Other types of businesses, such as hardware and grocery stores, can be variable in the amount they depend upon passing traffic. *(Source: Weisbrod and Neuwirth, 1998)*

In an analysis of sales volumes for businesses affected by left turn restrictions versus a comparison group, (adverse) changes in sales were found to be statistically significant for gasoline stations and nondurable retail stores. Other types of businesses did not show any significant change in sales, except for grocery stores which showed a statistically significant increase in sales following the implementation of left turn restrictions in this particular study. *(Source: Weisbrod and Neuwirth, 1998)* Since it is not clear how access restrictions could increase sales volume, it is likely that other factors were responsible for this study finding, demonstrating that many factors are involved in business revenues, not just convenience of access.

Interviews were conducted with 113 business owners affected by left turn restrictions. Of these, 46 percent believed that the left turn restrictions had a negative effect on their business, 33 percent believed there was no effect, and 14 percent said they experienced a positive effect after the restrictions were implemented. Some business owners reported that sales declined immediately after the restrictions were imposed, but they increased again later. Several businesses stated they increased advertising to remain competitive and to overcome difficulties resulting from access changes.

Comments from business owners indicate that businesses that are primary destinations for customers (e.g., car dealerships, furniture stores, department stores, supermarkets, and building or electrical supply stores) may be less affected than businesses depending on pass-by traffic (e.g., gas stations, fast food restaurants and ice cream or donut shops). This may be because of the unique merchandise, service, or the customer’s loyalty to the establishment. *(Source: Weisbrod and Neuwirth, 1998)*

Based on case study data collected for the left turn effects report, the authors estimated the percentages of dependence on “convenience” or “impulse” trips by different types of businesses, as follows:

- Gas stations – 95 percent
- Convenience stores – 95 percent
- General Merchandise – 65 percent
- Restaurants – 50 percent
- Durable Goods – 40 percent
- Supermarkets – 40 percent
- Services – 30 percent
- Specialty Stores – 20 percent

The author of this study noted that these default values should be adjusted if the business has a loyal customer base or if prices are substantially different from those of competitors, which would reduce adverse impacts. The literature concludes that ease of access is only one of many factors that influence business location choices and the ongoing success of any particular business. Other factors, such as the type of business, the specialty of the merchandise or service offered, the prevalence of local competitors, customer sensitivity to price and quality, customer loyalty, and the state of the local and regional economy influence business profitability.

Classification of Local Businesses by Type

For the purpose of assessing effects to businesses, an effort was made to classify each of the businesses along the Route 101 corridor between Eureka and Arcata as belonging to one of the following groups. (Note that none of the project alternatives would substantially affect the access of businesses south of the Eureka Slough bridge or businesses north of the Bayside Cutoff, and are not listed or classified.)

Type I: Businesses Highly Dependent on Pass-by Traffic (includes those that cater to the traveling public or depend on spontaneous purchases; e.g., gas station, convenience store, motel, cocktail lounge, fast food restaurant, donut or ice cream shop).

Type II**:** Businesses with Variable or Uncertain Dependence on Pass-by Traffic (includes those with relatively good availability of similar goods and services from competing sources; e.g., shopping malls, supermarkets or hardware stores).

Type III**:** Businesses Least Dependent on Pass-by Traffic (includes specialty goods/services providers and destination-oriented businesses; e.g., electrical supplies, appliance repair, furniture stores, new auto sales, department stores, veterinary services and industrial facilities).

Based on field observations, Caltrans mail survey results, and information obtained at the May 15, 2003 Open House, the businesses along the Route 101 corridor were classified as follows:

- California Redwood Company - III
- Bracut Industrial Park businesses:
    - − mobile home storage – III
    - − millworks – III
    - − lumber company – II
- Pacific Hoe, Saw & Knife Co. – III (Closed since Draft EIR/S circulated)
- Redwood Reliance Trailer Sales - III
- Hyster Sales Co./Bobcat West - III
- Eureka Oxygen Co. - III
- Redwood Kenworth Co. - III
- John’s Used Cars & Wreckers - III
- Resco United Rentals - III
- U-Haul Rentals - III
- Happy Dog - I (day care)/II (boarding)
- Applied Industrial Technologies – III (Closed since Draft EIR/S circulated)
- Gas Stoves with Style - III
- Trinity Diesel Inc. (parts and service) – III (Closed this location and moved to Boyd Road in Arcata since Draft EIR/S circulated)
- Rogers Machinery Co. - III
- Superior Alarms Inc. - III
- Rainbow Self-Storage - III
- Mid-City Motor World/Harper Ford (car sales and service) - III
- WB Co. (electric service) - III
- R & S Supply (roofing and building supplies) - II
- Carl Johnson Co. - II
- Johnson Ranches Farm Store - III
- Animal Emergency Center – III (Closed since Draft EIR/S circulated)
- Murray Field - III

- United Grocers Cash & Carry - II
- J's RV Center (RV sales) - III
- Redwood Coast Cabins and RV Resort (formerly Eureka KOA) - I
- Resale Lumber Products (recycled lumber, firewood, building supplies) - III
- Country Store Collectibles (new and used collector items) - III

As shown above, only two of the businesses along the Route 101 corridor appear to be Type I businesses--the Redwood Coast Cabins and RV Resort (formerly Eureka KOA campground), which caters to the traveling public, and Happy Dog, which provides pet care and boarding services. Approximately one third of Happy Dog's business is day boarding or dog "day care," and a majority of day care customers commute between Eureka and Arcata (i.e., live in one city but work in the other). These customers drop their pets off on the way to work and pick them up on the way home, making the convenience of access off Route 101 critical to them.

Four other corridor businesses were identified as Type II businesses and include two building supply retailers, a ranch supply store, and a grocery store. Some studies suggest that certain types of similar retail businesses (including lumber and hardware sales) could be subject to a potential decline in sales, especially if they have competitors in the vicinity that are easier to access by customers and that offer the same or better quality and prices.

The majority of the businesses currently located along the corridor were identified as Type III businesses because they provide some type of specialty merchandise or services, or are primary shopping destinations. These are the types of businesses that, theoretically (according to the studies reviewed), should be least likely to be affected substantially by changes in access. As documented throughout the survey, many of them have been in business a long time and have nurtured customer loyalty. The majority of their customers are local, meaning that they very likely travel both north and south along the Route 101 corridor between Eureka and Arcata on a regular basis.

Under Alternatives 1, 1A, and 2, customers of these businesses would no longer be able to do their errands or shopping readily on *either* their northbound *or* their southbound trip. Instead, they may choose to organize their errands to coincide with northbound or southbound journeys, patronizing a particular business (depending on its location) on one leg of their journey or the other. This would be less convenient than it is at present, but not impractical when the inconvenience is balanced by the benefit of having a safer travel corridor with fewer collisions involving fatalities and injuries at intersections.

The degree to which current customers would behave this way, however, is likely to vary depending upon the business. Some business owners expressed confidence that their customers would continue to come, and that roadway changes would not affect their sales; others stated that the easy access onto and off Route 101 is critical to their business.

In addition to owners of Types I and II businesses, the following businesses submitted written comments:

- Animal Emergency Center (customers with animals needing emergency care need quick access to facility);
- Rainbow Self-Storage (customers need frequent access to their stored goods);
- Redwood Kenworth (it would be too difficult for customers driving tractor-trailers southbound to make U-turns in Eureka; the owner estimates that net profit could drop as much as 30 percent due to increased cost of doing business, longer times needed for purchasing trips to Eureka, and more demand for deliveries to customers who now pick up merchandise themselves).

LAND USE

Compatibility with Existing Land Uses

For all Build Alternatives, the proposed roadway improvements would mostly be constructed within the existing Route 101 highway right-of-way. Temporary construction easements would be required on the west side of Route 101 at Bracut for all Build Alternatives. For Alternative 1A, right-of-way acquisition on the east side of Route 101 at Bracut would be needed for a proposed turnaround. An encroachment permit would be needed for tide gate replacement. For Alternative 3, an encroachment permit from the County of Humboldt would be required for work within the County airport (Murray Field).

Project construction would not temporarily or permanently impair any existing land uses; therefore, these alternatives would not result in any changes to existing land uses or displacements of any existing homes or businesses. (See Chapter 2 for Alternatives descriptions and the Plan Sheets 7 through 16 in Appendix A for right-of-way and easement acquisition locations.) These alternatives would not divide or disrupt the physical arrangement of any existing community or agricultural operation, nor would they require any changes to existing land use designations or zoning in the project vicinity. Alternative 7 (No-Build) would involve no new construction and would not affect existing land uses in the project vicinity. Therefore, all project alternatives would be compatible with existing land uses in the study area.

Public Recreation

None of the Alternatives would directly or indirectly impact recreational activities or access to Humboldt Bay, wildlife refuges, or playing fields (near the Route 101/255 interchange in Arcata) either during construction or after construction. Within the project construction limits, there are no designated public parking lots or trails accessible from Route 101 for any of these public recreation areas.

Resources Evaluated Relative to the Requirements of Section 4(f)

Section 4(f) of the Department of Transportation Act of 1966, codified in federal law at 49 U.S.C. 303, declares that "it is the policy of the United States Government that special effort should be made to preserve the natural beauty of the countryside and public park and recreation lands, wildlife and waterfowl refuges, and historic sites."

All Build Alternatives would avoid the use of any Section 4(f) public recreation areas within half-mile of the project limits. Refer to Appendix D for more information.

Consistency with Adopted Plans and Policies

None of the project alternatives would require any amendments to adopted General Plans, Murray Field Master Plan, or other adopted local planning goals and policies. No inconsistencies with local adopted goals and policies of the City of Arcata, City of Eureka or County of Humboldt were identified. Alternative 7 (No-Build) may be inconsistent with Humboldt County's advisory Public Services and Facilities Policy 4231.3, which states that "significant increases in traffic volumes and turning movements on and off a major expressway/freeway at high volume at-grade intersections should be discouraged." It may also be inconsistent with HCAOG's roadway Policy 1.03 to "support safety improvements on highways, roadways and streets in the HCAOG region." This alternative would result in substantial increases in traffic volumes and turning movements on and off Route 101 at high volume at-grade intersections. Therefore, safety conditions are expected to deteriorate over time as traffic volumes increase along the Route 101 corridor. (For information regarding regional transportation planning, see Chapter 1, Section 1.3—Project Background.)

Project Consistency with Local Coastal Plans and California Coastal Act

The proposed project on Route 101, from the Eureka Slough bridges at the south end and north to the 11th Street overcrossing in Arcata, is within the local Coastal Zone jurisdictions of the County of Humboldt, the City of Arcata, the City of Eureka as well as the State-retained Coastal Zone jurisdiction. Caltrans will likely request the consolidation of local and state coastal permits for the entire project and apply for one Coastal Development Permit from the California Coastal Commission for all jurisdictions within the Coastal Zone.

Although the project would improve public coastal access, California Coastal Commission staff determined that, without compensation, the project would result in adverse effects to wetlands, non-motorized transit access, and the visual setting.

In accordance with the provisions of the Coastal Zone Management Act (CZMA), Section 307(c)(3)(A), and 15 CFR Part 930.57(a), Caltrans, working with the Federal Highway Administration (FHWA), prepared the coastal consistency findings for Modified Alternative 3A, identified as the Preferred Alternative, to comply with the federal consistency requirements of the CZMA.

On November 14, 2013, the California Coastal Commission issued a Revised Findings on Consistency Certification (Appendix L, note that it contains tracked changes from the original Staff Recommendation) that determined that Modified Alternative 3A would comply with Chapter 3 of the Coastal Act with the following conditions:

1. ***Coastal Trail Planning.*** Construction of the Route 101 Corridor Improvements will not commence until adequate commitments are in place to assure that a separate Class 1 bike and pedestrian trail, parallel to Route 101 from Arcata to the northern end of downtown Eureka, will be constructed and operational by the time the major project components are completed. Such commitments will include, but may not be limited to, assurances that adequate funding for construction of the trail exists, as well as a demonstration that the necessary assurances are in place to secure ownership interests or permissions to enable the trail construction to proceed in a timely manner, prior to or concurrent with construction of the corridor improvements.

2. ***Visual Impact Mitigation***. Prior to or concurrent with its submittal to the Commission of a Coastal Development Permit application for the project at issue, Caltrans will develop and submit a plan to the satisfaction of the Executive Director to provide mitigation for the visual impacts of the project by removing, to the maximum extent feasible, all billboards along the corridor, as well as other overhead infrastructure (such as power poles and power lines), and by steepening the inside slopes proposed for the Indianola interchange to maximize the view towards the bay from Indianola Cutoff.

3. ***Wetland Mitigation.*** Prior to or concurrent with its submittal to the Commission of a Coastal Development Permit application for the project at issue, Caltrans will: (1) expand the Samoa restoration concept to include true tidal restoration; (2) provide a biological analysis showing that the acreages are adequate and/or habitat mixes would, in fact, fully mitigate the project's impacts; (3) submit and receive Commission approval of Coastal Development Permits for the restoration activities at the two sites; and (4) follow up on Caltrans' commitment to further substantiate the unavailability and infeasibility of non-agricultural sites in the Humboldt Bay area.

4. ***Sea Level Rise Planning.*** Prior to or concurrent with its submittal to the Commission of a Coastal Development Permit application for the project, Caltrans will complete its "Climate Change Adaptation Pilot Strategy for Critically Vulnerable Assets in Northwest California," and the project described in the permit application submitted to the Commission will reflect the findings and implications contained in that study, including any necessary redesign to incorporate appropriate sea level rise-related adaptation strategies.

(Source: CCC, 2013)

Potential Division of Established Communities

None of the project alternatives would realign Route 101 or displace any homes or businesses from the study area, so they would not divide or disrupt an existing community. All Build Alternatives, however, would restrict access and force out-of-direction travel resulting in delay and increased fuel consumption. This could cause economic hardship for households residing at Lazy J Trailer Ranch and the Redwood Coast Cabins and RV Resort (formerly Eureka KOA), potentially causing low-income residents to relocate. Alternative 3, which includes signalization at Airport Road, would improve access for the Lazy J Trailer Ranch residents but not help Redwood Coast Cabins and RV Resort residents.

At public meetings and in written comments, residents of Manila complained to Caltrans that the Safety Corridor program (reduced posted speed limit on Route 101) resulted in an increase in traffic levels on Route 255 through their community. Traffic counts confirm that there was an increase in traffic on Route 255 after the Safety Corridor program was implemented. However, Route 101 remains the shortest, most direct route between Eureka and Arcata. No disproportionately high and adverse impacts to the community of Manila were identified under any of the project alternatives. (See Chapter 3, Section 3.1.6 Traffic and Transportation, for more information.)

Effects to Business Access Summary

Although the proposed closing of medians under any one of the Build Alternatives could contribute to lower sales (and associated income and job losses) for some of the affected businesses, there is no reliable basis that can be used to quantify or predict this relationship. Unfortunately, there is no standard or accepted methodology for estimating loss of business patronage due to turn restrictions. (Even the nationwide study that surveyed 250 agencies and analyzed data from over 9,200 businesses failed to develop a predictive model that might be used to estimate the economic effects on other businesses faced with left turn access restrictions.) Because there are so many factors influencing business activity, it is not possible to isolate one factor—ease of access—and predict how changing that single factor would affect a business's bottom line. Attempting to quantify potential revenue losses for each business would be speculative. However, it is likely that Type I businesses would be affected the most and Type III businesses the least. Sales tax revenues associated with these businesses could also be reduced, but such revenue losses to the city or county would not be expected to be substantial.

It is clear that impacts to local businesses would be less under Alternatives 2, 3, and Modified Alternative 3A—which provide a grade separation at Indianola—than under Alternative 1, which causes the most out-of-direction travel and increased travel times to access Route 101 corridor locations. Alternative 1A, which includes turnarounds, would also provide better access for businesses compared to Alternative 1, but access would be best with Alternatives 3 and Modified Alternative 3A.

For Alternative 3 and Modified Alternative 3A, businesses accessed via Airport Road would not be affected because this median crossing would remain open, but left turn access to Mid-City Motor World, California Redwood Company, and KOA Drive/Bracut Industrial Park businesses from southbound Route 101 would be eliminated.

For Alternative 7 (No-Build Alternative), access at all Route 101 medians would remain at all intersection locations, however traffic congestion and collisions would increase over time, which could indirectly affect local business patronage. Even though the No-Build Alternative does not include any proposed roadway changes, traffic volumes and speeds are expected to increase in the foreseeable future, which may necessitate closing one or more Route 101 intersection median openings within the corridor. (See the No-Build Alternative description in Chapter 2 for more information regarding potential median closure.) Closing one or more intersection median openings could potentially restrict access to businesses and add out-of-direction travel and delay that would be similar to Alternative 1.

AVOIDANCE, MINIMIZATION, AND/OR MITIGATION MEASURES

While direct taking of commercial property for transportation purposes is compensable under the Uniform Relocation Assistance and Real Property Acquisition Act of 1970, changes in travel patterns or provision of alternative access to homes or businesses are not compensable under Federal law. Since none of the proposed project alternatives would cause the actual physical taking of property, no property or business owners would be eligible for acquisition and relocation benefits.

Because of the existing Route 101 configuration and sensitive environmental setting, features such as new frontage roads that could offset access restrictions are not feasible. However, Alternatives 1A, 3, and Modified Alternative 3A were designed to minimize out-of-direction travel that would result from access restrictions. (See Chapter 3, Section 3.1.6 Traffic and Transportation for more information.)

As described previously, after project construction, Route 101 intersection accesses would change. In order for businesses to anticipate, plan, and make any adjustments to the access restrictions, Caltrans would provide advance notification of project progress.

3.1.2 Growth

REGULATORY SETTING

The Council on Environmental Quality (CEQ) regulations, which established the steps necessary to comply with the National Environmental Policy Act of 1969, require evaluation of the potential environmental consequences of all proposed federal activities and programs. This provision includes a requirement to examine indirect consequences, which may occur in areas beyond the immediate influence of a proposed action and at some time in the future. CEQ regulations, 40 CFR 1508.8, refer to these consequences as secondary impacts. Secondary impacts may include changes in land use, economic vitality, and population density, which are all elements of growth.

The California Environmental Quality Act (CEQA) also requires the analysis of a project's potential to induce growth. CEQA guidelines, Section 15126.2(d), require that environmental documents "…discuss the ways in which the proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment…"

AFFECTED ENVIRONMENT

See previous section, 3.1.1 – Land Use, Community, Businesses for affected environment information.

ENVIRONMENTAL CONSEQUENCES

Land use and transportation are interrelated in complex ways, and changes in transportation facilities can influence changes in land use. According to the National Research Council's Transportation Research Council, such changes in land use can occur in different ways or for different reasons. For example:

- The growth that would have occurred anyway could be arranged in a different pattern, with changes in the types, densities, or locations of new development. New commercial activities might choose sites that the project makes more accessible rather than other sites in the study area. For example, additional highway capacity could cause a shift of some residential development from urban to rural areas because of the improved access to jobs and other destinations from the rural area.

- The transportation project could attract some households or businesses to locate in the study area instead of other places in the region or to other regions. For example, if access is improved to land on the urban fringe that is otherwise ready for development, developers may capitalize on the improved access and build homes in these areas instead of elsewhere in the region. In another example, the expansion of an airport might attract businesses dependent upon air service to locate in the study area instead of near another airport. In these examples, the transportation projects could provide incentive for certain types of growth within the project area.

- The transportation project could stimulate changes in existing land uses and intensities in already developed areas by improving access. For example, residential properties near a new grade separation might be redeveloped into commercial buildings because the changes in accessibility would make the land more attractive to commercial users who would offer higher prices for the land.

Whether or not these types of changes in land use would occur is not readily predictable because access is only one of many factors that influence land use and development. Other factors include regional growth trends, local land use controls, and local real estate market conditions. The purpose of a transportation impact analysis is to evaluate the relative importance of changes in access compared with other factors that could influence or constrain development at a particular location. This information can then serve as a basis for a reasonable estimate of the nature and magnitude of changes that might be expected to result from a particular transportation improvement, as well as a judgment as to the significance of such changes in a defined study area (Parsons Brinckerhoff Quade & Douglas, Inc., 1998).

The Caltrans guidance on *Community Impact Assessment* (Caltrans, 2011) and Caltrans *Guidance for Preparers of Growth-related, Indirect Impact Analyses* identify a variety of methodological approaches for evaluating growth inducement potential that may be associated with proposed transportation improvement projects. The Community Impact Assessment report prepared for the Route 101 Corridor Improvement Project used a Growth Inducement Checklist as the basis for evaluating the growth inducement potential associated with each project alternative. That analysis concluded that Alternatives 1, 1A, and 7 (No-Build Alternative) would not have a growth-related impact, but that Alternatives 2, 3, and Modified Alternative 3A could potentially have a growth-related impact because these alternatives would include construction of a new grade separation. After examining other constraints to development in the Indianola vicinity, however, it concluded that while the project could contribute to growth pressures in the area, other substantial constraints to development would remain in place. For this reason, it was concluded that these alternatives would not be considered “growth inducing.”

Questions that are typically asked to identify a project’s potential to induce unplanned or undesired growth in a particular area are the following:

1. Will the project attract more residential development or new population into the community or planning area? Is the number of vehicle trips likely to change?

2. Will the project encourage the development of more acreage of employment-generating land uses in the area (such as commercial, industrial or office)?

3. Will the project lead to the increase of roadway, intersection, sewer, water supply, or drainage capacity? In terms of transportation, do the project alternatives have the potential to affect travel speeds, travel times, change access, improve congestion, or affect highway LOS?

4. Will the project encourage the rezoning or reclassification of lands in the community general plan from agriculture, open space or low density residential to a more intensive land use?

5. Does the project conflict with the growth-related policies, goals or objectives of the local general plan or the area growth management plan? Or is it in conflict with the implementation measures contained in the area's growth management plan?

6. Will the project lead to the intensification of development densities or accelerate the schedule for development, or will it facilitate actions by private interests to redevelop properties within two miles of an existing or future major arterial roadway or within four miles of a limited access highway interchange (grade separation)?

7. Will the project measurably and significantly decrease home to work commuter travel times to and from or within the project area (more than 10 percent overall reduction or five minutes or more in commute time savings)?

For Alternatives 1, 1A, and 7, the answers to all of the above questions would be "No," meaning that these alternatives are not likely to result in a growth-related impact. The following are specific responses to the questions:

> ***Response to questions 1 and 2.*** Alternatives 1, 1A, and 7 would either restrict highway access or maintain the existing access; consequently, the surrounding land would not become more desirable for development.
>
> ***Response to questions 3, 4, 6, 7.*** Alternatives 1, 1A, and 7 would not increase the highway carrying capacity of the roadway nor would they change traffic patterns to favor growth; consequently Alternatives 1, 1A, and 7 would not increase the demand for services.
>
> ***Response to questions 5.*** Alternatives 1, 1A, and 7 do not require the conversion of land currently zoned agriculture and open space within the Route 101 corridor.

For Alternatives 2, 3, and Modified Alternative 3A, the answers to the above questions would be "No," with one exception — "Would this alternative facilitate actions by private parties to redevelop properties within two miles of an existing or future major arterial roadway or within four miles of a limited access highway interchange (grade separation with ramps)?" Because Alternatives 2, 3, and Modified Alternative 3A would include the construction of a new grade separation, the answer to this question is "Perhaps." For the Build Alternatives with a grade separation, additional consideration of growth inducement impacts is provided below using an alternative methodology for growth inducement analysis in which a series of factors affecting (either stimulating or constraining) growth in a defined project area are evaluated.

These factors include the following:

1. ***Cost of Land*****:** Is the cost of land in the affected area high, average, or low (as compared to the county or statewide figures)?
2. ***Local Government Plans and Policies:*** Do local government plans and policies support or restrict growth in the affected area?
3. ***Articulated Public Attitudes:*** Does public opinion as articulated in public meetings, the political process or the media, support or oppose growth in the affected area?
4. ***Terrain and Land Use:*** Is the terrain of the affected area suitable for development? Are existing land uses in the affected area conducive to or would they conflict with new residential/retail/office/industrial growth?
5. ***Cost and Labor Pool:*** Are the cost, availability and skills of the labor pool in the affected area conducive or restrictive to employment growth?
6. ***Commute Time:*** How would commute times to the affected area be changed?
7. ***Access:*** Location and spacing of interchanges (grade separations); capacity changes.
8. ***Infrastructure:*** Is the existing infrastructure (e.g., local roads, water and sewage facilities, schools and community facilities) adequate or inadequate to handle growth? Would the local economy support construction of new facilities?
9. ***Constraints:*** Are there any features on the highway that could constrain the new capacity of the transportation improvement? For example, if a section of two-lane road is expanded to four lanes, the actual capacity of the four-lane section may be constrained by the unimproved two-lane segments at each end of the four-lane improvement.

The sections below review existing conditions and projected development trends in the project vicinity and then discuss the above factors as they pertain to the project area, with special focus on the vicinity of Indianola Cutoff since that is the area where several of the project alternatives propose a new grade separation and the area of greatest resource interest.

Existing Conditions and Projected Trends

According to the National Cooperative Highway Research Program's Desk Reference for Estimating the Indirect Effects of Proposed Transportation Projects (The Louis Berger Group, 2002), “development effects are most often found up to one mile around a freeway interchange.” Existing land classifications within one mile of the proposed grade separation at Indianola Cutoff are shown on Figure 3-2[11]. Most of the area west of Route 101 is occupied by Arcata Bay and adjacent wetlands, with the exception of the Bracut industrial area to the north and the northern portion of the Brainard industrial area to the south. On the east side of Route 101, there are limited areas of industrial-commercial and rural residential development among large expanses of open space, such as the Fay Slough Wildlife Area and farmlands. Figure 3-2 also illustrates the presence of key development constraints, including the 100-year floodplain and designated wetlands. There are no known proposals for additional development in the vicinity of Route 101 and Indianola Cutoff at this time, either within the city of Eureka or in unincorporated Humboldt County (Wall, 2008; Estlow, 2008).

Population and employment growth is expected to continue in Humboldt County and in the greater Eureka-Arcata area in the future, albeit at a slower rate than the rest of California and major metropolitan areas such as Los Angeles, San Francisco and Sacramento. According to the Humboldt County 2006 Regional Transportation Plan Update, the county population is expected to grow by 8.3 to 17.4 percent by 2025 and employment is expected to increase by 15.8 percent. New growth would be attracted to these areas for a number of reasons including general real estate market conditions, the location of community amenities, the availability of water and sewer services, and other development constraints such as terrain, zoning, and environmental factors (e.g., the presence of floodplains or wetlands).

The following paragraphs address factors that could encourage or discourage growth and development in the Indianola study area compared with other parts of the greater Eureka-Arcata region. Where appropriate, local experts were consulted to provide insights and information about development conditions in the area.

1. ***Cost of Land:*** *Is the cost of land in the affected area high, average, or low (as compared to the county or statewide figures)?*

According to real estate professionals familiar with local commercial market conditions, land in the vicinity of Route 101 and Indianola Cutoff is neither high nor low relative to the cost of similar commercial properties in the region (Pesch, 2008; MacDonald, 2008). Therefore, commercial land prices in this area would be considered average.

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[11] The color-coded land classification shown on Figure 3-2 is based on 1996 Humboldt County land use survey data developed by the California Department of Water Resources (DWR) through its Division of Planning and Local Assistance. Information on development constraints, including 100-year floodplain boundaries and designated wetlands, was obtained from readily available GIS data layers for the study area. Industrial-commercial areas were identified both from the DWR database and aerial photographs.

2. ***Local Government Plans and Policies:*** *Do local government plans and policies support or restrict growth in the affected area?*

Lands in the vicinity of the proposed grade separation lie within the jurisdiction of the City of Eureka and County of Humboldt. Lands in the local Coastal Zone (which encompasses land between the bay and Myrtle Avenue/Old Arcata Road) are under the jurisdiction of the California Coastal Commission. Figure 3-3 shows the current zoning within one mile of the proposed grade separation at Indianola Cutoff. Within the project area, lands within Humboldt County are zoned predominately for agricultural and rural residential uses, while lands within the Eureka city limits are zoned for agricultural use, except for the Commercial Service and Estate Residential areas immediately south of Indianola Cutoff. This limited area of commercial and residential use at the north end of the city is separated from the rest of Eureka's urban area by over a mile of sensitive wetland habitat and preserved open space. This sensitive area is well protected by adopted local plans and policies, as well as zoning, as discussed previously in Section 3.1.1 - Land Use, Community, Businesses.

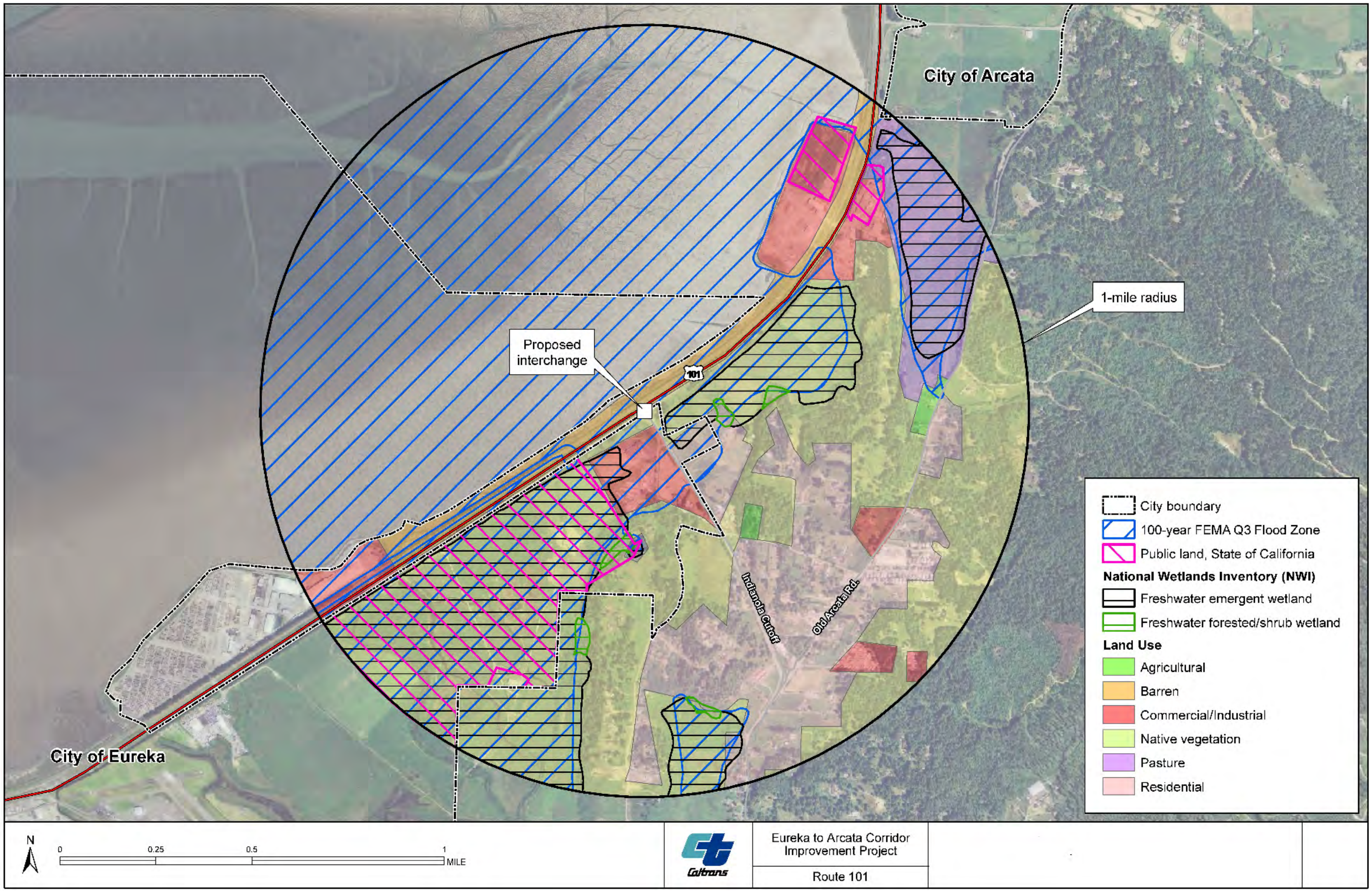

Figure 3-2 Land Classification within One Mile of Proposed Grade Separation

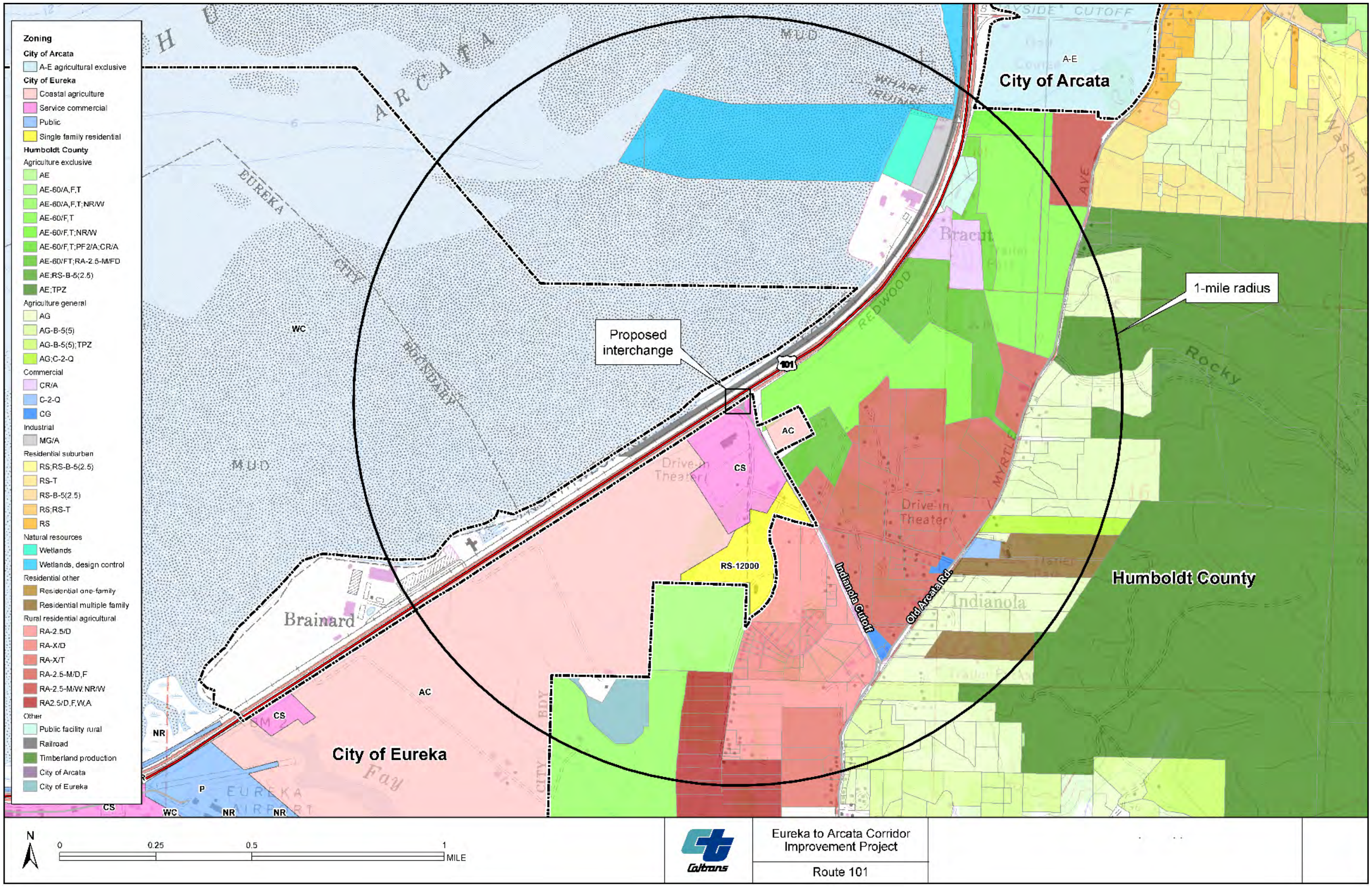

Figure 3-3 Zoning within One Mile of Proposed Grade Separation

The City of Eureka has an Enterprise Zone that has been in place since 1986. This program targets economically distressed areas and provides tax incentives to stimulate business investments and job creation. The Enterprise Zone program encompasses the properties along the Route 101 corridor, including those on the south side of Indianola Cutoff. City staff expects that only existing businesses would be able to take advantage of it and that it would not affect future development patterns.

In 1993, there was a proposal to construct a Sam's Club in the vicinity of Route 101 and Indianola Cutoff. The project was abandoned because of infrastructure constraints, permitting complexities (since the area lies within the Coastal Zone and would require a Coastal Development Permit, city permits, and a Caltrans encroachment permit), and potential traffic impact mitigation costs. (Both Costco and Walmart subsequently looked at locating to the same vicinity and for similar reasons also decided against it.) A proposal to expand facilities at Bracut Industrial Park was also abandoned due to the costs of completing the environmental analysis for the project and potential mitigation costs.

*3. **Articulated Public Attitudes:** Does public opinion as articulated in public meetings, the political process or the media, support or oppose growth in the affected area?*

Attitudes expressed by the public toward growth and development in the vicinity of Route 101 and Indianola Cutoff are mixed. In general, residents of the region value the open space and rural feel of the land between Eureka and Arcata, want to maintain clear definition between the two cities, and do not favor any additional strip commercial development along Route 101 (MacDonald, 2008; Glass, 2008). In addition, the City of Eureka ballot Measure J to support building a Walmart in this area was rejected by Eureka voters in 1999.

*4. **Terrain and Land Use:** Is the terrain of the affected area suitable for development? Are existing land uses in the affected area conducive to or would they conflict with new residential/retail/office/industrial growth?*

The terrain in the grade separation vicinity is suitable for development in the sense that it is relatively flat; however, it is constrained by the presence of wetlands and the 100-year floodplain (as illustrated on Figure 3-2). Existing agricultural and wetland or open space uses in the vicinity of the proposed intersection would conflict with new development, but existing commercial areas (i.e., the CS zoned area in the southeast quadrant of the existing intersection) and rural residential areas (along Indianola Cutoff and Indianola Road and further east) could be compatible with new infill development consistent with the zoning.

5. ***Cost and Labor Pool:*** *Are the cost, availability and skills of the labor pool in the affected area conducive or restrictive to employment growth?*

This question is not pertinent to the grade separation area, as the labor pool in this vicinity would be the same regional labor force that would be used for any construction or development project in the greater Eureka-Arcata area and perhaps even Humboldt County as a whole. Thus, the availability and skills of the labor pool in the affected area are neither conducive nor restrictive to employment growth.

*6****.*** ***Commute Time:*** *How would commute times to the affected area be changed?*

The project primarily would affect roadway safety and LOS, but the predicted deterioration of LOS under the No-Build Alternative would slow commute times in the future. The various "build" alternatives would prevent slowing of commute times in the future. Generally speaking, the project would not improve commute times, but in fact the alternatives that include median closures would increase commute times for commuters who live and/or work along the Route 101 corridor. (See Chapter 3, Section 3.1.6 Traffic and Transportation for more information.)

7. ***Access.*** *Location and spacing of interchanges (grade separations); capacity changes.*

Access to land in the vicinity of the proposed new grade separation would not be impacted substantially by the project because this land is already accessible via Indianola Cutoff, Indianola Road and Old Arcata Road. The project could result in an increase in the number of cars per hour that could use the new grade separation (vs. the existing intersection), but any such capacity increase would not affect the carrying capacity of the adjacent roadways since no improvements are proposed there.

8. ***Infrastructure:*** *Is the existing infrastructure (e.g,. local roads, water and sewage facilities, schools and community facilities) adequate or inadequate to handle growth? Would the local economy support construction of new facilities?*

The commercially zoned area south of Indianola Cutoff and within the city of Eureka is served by a pipeline that supplies potable water; however, there is no sewer service to the area, and the land is not suitable for septic systems. The few businesses located along Indianola Road were developed at a time when a new sewer line from Arcata to Eureka was being considered. However, that plan was abandoned, so the few businesses in the vicinity rely on holding tanks and sewer pump-out service. The City of Eureka is unlikely to extend sewer service to the area due to the environmental impacts and costs associated with constructing a new pipeline across protected wetlands. Thus, sewer service is likely to remain a significant constraint that would limit future commercial development in the area (Hamblin, 2008). Current Caltrans policy prohibits pipeline construction within its right-of-ways.

A detailed *Community Infrastructure and Services Technical Report* completed in 2008 for Humboldt County identified existing infrastructure constraints throughout the county, including in the Indianola Water Service Area (WSA). The report concluded that the growth of residential uses in the Indianola area over the next two decades would be well below the projected countywide housing growth because of physical and zoning constraints in the area. The Indianola WSA currently has an estimated 516 housing units. Based on the countywide projected housing growth rate of 0.5 to 2.5 percent, housing units in the Indianola WSA could be expected to increase to between 570 and 846 total housing units by 2025. Because of the physical and zoning constraints, only 162 new housing units were projected for this area. The report recommended providing a new water system to this area to serve the existing and projected new homes because residents of the area currently rely upon wells, and well water in the vicinity is of poor quality. *(Source: Winzler & Kelly, 2008)* It remains adopted policy that the City of Eureka will not provide new water hookups to any area outside city limits; however, a group of residents in the unincorporated county area have requested that the City extend water service to their homes because they are experiencing water quality problems.

*9. **Constraints:** Are there any features on the highway that could constrain the new capacity of the transportation improvement? For example, if a section of two-lane road is expanded to four lanes, the actual capacity of the four-lane section may be constrained by the unimproved two-lane segments at each end of the four-lane improvement.*

Any increase in operational efficiency provided by a new grade separation at Indianola Cutoff would be constrained by the limited capacity of the existing local roadways (Indianola Cutoff and Indianola Road) because no improvements are proposed to be made to these roads as part of the Eureka-Arcata Route 101 Corridor Improvement Project. The current configuration of the Route 101 intersection at Indianola Cutoff has a capacity of approximately 2,100 passenger cars per hour. (Of this, the left turn volume capacity is currently very low but the right turn volume capacity—for turns both off of and onto the northbound lanes of the freeway—is high).

While the project would not increase the capacity of existing Route 101, the proposed grade separation would have a capacity of approximately 3,100 cars per hour, or a capacity increase of about 47.6 percent over the capacity of the existing intersection. The capacity of Indianola Cutoff, which would allow turn movements of approximately 2,000 cars per hour, would constrict capacity of the proposed grade separation at the northbound on- and off-ramps. Thus, the grade separation would provide limited increase in traffic operational efficiency, except that it would allow many more vehicles to enter Indianola Cutoff from the southbound lanes of Route 101. The existing roadway is sufficient to serve relatively intense commercial retail uses (with perhaps some turn lane modifications), and grade separation construction could increase pressure for eventual future County widening of Indianola Cutoff, should that become necessary.

Findings and Conclusions

CEQ defines direct effects as inevitable and indirect effects as probable, not merely possible (CEQ, 1987). The Route 101 Corridor Improvement Project would not directly cause growth in the project area (e.g., through the construction of new homes or businesses). Predicting indirect impacts is more challenging and can be somewhat speculative. In reviewing the factors discussed previously, it appears that there are influences that both encourage and constrain future growth in the Indianola Cutoff vicinity. Land costs are comparable to other parts of the region. Local government plans and policies support limited commercial and residential growth in the area, but are protective of surrounding wetlands and agricultural open space, and the fact that much of the area lies within the Coastal Zone increases the complexity of obtaining development permits. Public attitudes generally oppose expansion of development other than what is permitted under current land use designations and zoning. The terrain is relatively flat but constrained by the presence of wetlands, and there are substantial sewer and water service constraints.

On the other hand, the commercially zoned land near Route 101 is currently underdeveloped (e.g., mini-storage units and a recreational vehicle sales lot), and has attracted interest in the past as a potential site for large-scale commercial development. In addition, the existing rural residential lots in the area are not yet built out. Improving access by constructing a new grade separation would remove a major constraint to more intensive development of commercially zoned properties in the area—i.e., the need for expensive traffic mitigation measures. This could result in an increase in property values and/or an increase in pressure to build out or redevelop commercial properties (and even the adjacent rural residential areas) sooner than might otherwise occur. Therefore, construction of such a grade separation could have a growth-related impact; however, the growth-related impact potential of such a grade separation would be limited by a number of factors, including:

- lack of sewer service in the area;
- lack of potable water supply outside the city limits;
- limits on the capacity of Indianola Cutoff to handle certain types of traffic;
- permit complexities resulting from overlapping jurisdictional interests;
- the need to obtain Coastal Development Permits for development in the Coastal Zone; and
- prevailing public sentiment to preserve existing open space and wetlands from development.

For these reasons, while a new grade separation would contribute to growth pressures in the immediate project vicinity (i.e., it would have a growth-related impact), its impact – in the absence of any substantial change in the constraints noted above – would not be substantial. The proposed project would improve access to the Indianola area, but would not create new access to land that is currently inaccessible; consequently, natural and cultural resources in outlying areas would not be at risk directly or indirectly as a result of a new grade separation. A grade separation would make the commercially zoned property at the north end of Eureka more desirable for commercial development. Such development, however, would be consistent with site zoning and contemplated under existing General Plans. Given the substantial infrastructure constraints that remain in the surrounding area, the multi-jurisdictional permitting complexities, the presence of sensitive environmental resources, open space protections provided by adopted local policies, and prevailing public sentiment, the likelihood of additional development (that is not currently contemplated under local plans and policies) being stimulated by a new grade separation does not seem reasonably "probable."

AVOIDANCE, MINIMIZATION, AND/OR MITIGATION MEASURES

Since Alternatives 1, 1A, and 7 are unlikely to result directly or indirectly in a growth-related impact, there are no avoidance, minimization, or mitigation measures proposed for these alternatives. Since Alternatives 2, 3, and Modified Alternative 3A could indirectly result in a non-substantial growth-related effect, mitigation is not proposed.

3.1.3 Farmlands / Agricultural Lands

REGULATORY SETTING

The National Environmental Policy Act (NEPA) and the Farmland Protection Policy Act (FPPA, 7 USC 4201-4209; and its regulations, 7 CFR Part 658) require federal agencies, such as the Federal Highway Administration, to coordinate with the Natural Resources Conservation Service (NRCS) if their activities may irreversibly convert farmland (directly or indirectly) to nonagricultural use. For purposes of the FPPA, farmland includes prime farmland, unique farmland, and land of statewide or local importance.

The California Environmental Quality Act (CEQA) requires the review of projects that would convert Williamson Act contract land to non-agricultural uses. The main purposes of the Williamson Act are to preserve agricultural land and to encourage open space preservation and efficient urban growth. The Williamson Act provides incentives to landowners through reduced property taxes to deter the early conversion of agricultural and open space lands to other uses.

The California Coastal Commission regulates agricultural lands through the California Coastal Act. The regulations encourage maintaining the maximum amount of prime agricultural land in production and encourage agricultural preservation.

AFFECTED ENVIRONMENT

Between Eureka and Arcata, the Eureka-Arcata Route 101 Corridor is a relatively flat and straight section of coastal highway, with Humboldt Bay (which includes Arcata Bay) to the west and primarily agriculture and open space to the east. Humboldt County land use designations along the corridor include: "Natural Resource" in the wetland areas, "Manufacturing" at Bracut Industrial Park, and "Agriculture Exclusive" along the east side of the corridor.

Land along the corridor that is located within the Arcata city limits is designated primarily as "Agriculture Exclusive" for the preservation of agricultural uses, or "Natural Resource" for the protection of public and private lands with unique or sensitive resources.

The City of Arcata's General Plan 2020 states that "Arcata's environmentally conscious development guidelines, and surrounding permanent greenbelt, promote compact growth and resist the pressures for unplanned sprawl." The General Plan expresses a commitment to open space and agricultural land preservation, alternative transportation and energy use. It promotes the use of the least polluting, most efficient transportation means and encourages multi-modal transportation. Land Use Policy LU-6e states that land designated Agriculture Exclusive and Natural Resource are important components of Arcata's open space plan, as defined in the Open Space Element. Policy LU-6e promotes the conservation and management of these lands for their natural resource values, as well as their biological, hydrological and soil resources. The plan states that conversion of these lands to other non-compatible uses shall be prohibited.

Humboldt County's General Plan was last revised in 1984; however, the County launched a comprehensive General Plan update process in 2000. Since then, the County has been engaged in gathering data, examining the changes that have occurred over the past two decades, and developing projections to the year 2025 in order to plan for future population changes and associated community development needs in the unincorporated areas of Humboldt County. Existing policies in the 1984 General Plan (Volume 1 Framework Plan) are aimed at delineating urban and rural areas so that growth can be directed to the urban areas where services are available, and away from agricultural areas, open space and timberlands. The Plan states that development adjacent to agricultural land should be compatible with agriculture. The 1984 General Plan also contains policies aimed at accommodating growth in the county in an orderly manner through identification of spheres of influence and urban expansion areas where sufficient public services exist. The Plan encourages development of land not suitable for resource development before urban development is permitted on resource lands. The Plan states:

> *Factors such as public water and sewer availability, road and street capacity, police and fire protection, proximity to educational and health facilities and solid waste management should be assessed in urban development proposals. Agricultural land uses are protected through General Plan policies such as the following:*
>
> *Extension of services such as sewer, water and roads should avoid traversing agricultural lands. Where infrastructure must cross agricultural lands, they should be located in public*

> *right-of-way and provide a Level of Service consistent with the development density reflected in the Land Use Plan.*

The General Plan states a County goal "to develop, operate and maintain a well-coordinated, balanced, circulation system that is safe, efficient and provides good access to all cities, communities, neighborhoods, recreational facilities and adjoining regions" (Goal 4220). One of the specific policies under this goal states that "significant increases in traffic volumes and turning movements on and off a major expressway/freeway at high volume at-grade intersections should be discouraged" (Policy 4231.3). The Plan supports development of an integrated transportation system based on land use and one that accommodates bicycles and transit, as well as automobiles (Policy 4237.4). A working paper developed in 2002 as part of the County's General Plan update process, "Building Communities," includes a number of draft policy statements concerning the importance of transitional or buffer areas between urban and rural land uses. It underscores the need to balance open space and preservation of agricultural land with economic development and job creation in the coming decades.

Field crops, hay, and pasture yields have increased from $7,972,300 in 2000 to $10,483,400 in 2008 within Humboldt County, indicating a healthy trend. *(Source: Humboldt County Department of Agriculture, 2008)*

ENVIRONMENTAL CONSEQUENCES

None of the Build Alternatives would result in farmland or rangeland conversion or involve California Land Conservation Act (Williamson Act) contracts. In addition, there would be no temporary impacts to farmland or rangeland during project construction.

AVOIDANCE, MINIMIZATION, AND/OR MITIGATION MEASURES

The proposed project would not affect prime or unique farmland or farmland of local importance; consequently, mitigation is not required.

3.1.4 Environmental Justice

REGULATORY SETTING

All projects involving a federal action (funding, permit, or land) must comply with Executive Order (EO) 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations,* signed by President Clinton on February 11, 1994. This Executive Order directs federal agencies to take the appropriate and necessary steps to identify and address disproportionately high and adverse effects of federal projects on the health or environment of minority and low-income populations to the greatest extent practicable and permitted by law. Low income is defined based on the Department of Health and Human Services poverty guidelines. For 2016, this was $24,300 for a family of four.

All considerations under Title VI of the Civil Rights Act of 1964 and related statutes have also been included in this project. Caltrans' commitment to upholding the mandates of Title VI is evidenced by its Title VI Policy Statement, signed by the Director, which can be found in Appendix C of this document.

AFFECTED ENVIRONMENT

Humboldt County's population is predominately White. According to 2010 census data, approximately 18 percent of Humboldt County's population is minority, compared with over 58 percent of the population statewide. Census data indicates that approximately 17.1 percent of the County's population was living below poverty between 2006 and 2010, compared with approximately 13.7 percent of the population statewide. *(Source: U.S. Census Bureau, 2010)*

While these statistics indicate that the overall population of the study area would not be considered an Environmental Justice (EJ) population, further research and field investigations led to the identification of three small residential communities within the study area as probable EJ populations. These include residents of the Lazy J Trailer Ranch at Airport Road, the permanent residents of the Redwood Coast Cabins and RV Resort and the community of Manila on the Samoa Peninsula.

Lazy J Trailer Ranch and Redwood Coast Cabins and RV Resort

The Lazy J Trailer Ranch is at 3956 Jacobs Avenue, and the Redwood Coast Cabins and RV Resort is at 4050 North Highway 101. While the Redwood Coast Cabins and RV Resort (formerly KOA Campground) is primarily used for short-term RV or tent camping stays, there were approximately 22 permanent residents living in RV units at that facility in December 2004. The Lazy J Trailer Ranch was built in 1955 and has 54 rental spaces, 51 of which were occupied in December 2004.

Interviews with the managers of these facilities indicated that only one of the permanent Redwood Coast Cabins and RV Resort households and four of the Lazy J households are minority; thus, these residential populations are not predominately minority. *(Source: Davick Personal communication, 2004)* Identifying resident income levels proved to be challenging. The decennial census generally provides the most accurate household income data, but information is not available for such small geographic areas. An attempt was made to obtain tenant income information from application files at the Redwood Coast Cabins and RV Resort and Lazy J offices, but such information was not requested of applicants by one of the facilities, and only limited (and in some cases dated) information was available at the other. An attempt was made to survey the residents, as reported below, but the survey response rate was low.

FHWA guidance recommends using the Federal Department of Health and Human Services poverty guidelines to determine whether or not a household is low income.

The Health and Human Services poverty guidelines for 2016 are as follows:

SIZE OF FAMILY	ANNUAL INCOME
1	$11,800
2	16,020
3	20,160
4	24,300
5	28,440
6	32,580
7	36,730
8	40,890

(Source: Federal Register, January 2016)

A survey was prepared for residents of Redwood Coast Cabins and RV Resort and the Lazy J Trailer Ranch to determine whether or not the current household incomes of these residents exceeds these thresholds. Completed survey forms were received from nine of the Redwood Coast Cabins and RV Resort permanent residents. Of these nine households (five of which were single person households and four of which were two-person households), three reported incomes below the poverty threshold and six were above. Only seven of the 52 Lazy J Trailer Ranch households returned completed survey forms. Of these seven households, only one reported income below the federal poverty threshold.

It became apparent that use of the federal poverty threshold was too restrictive when it was realized that even an elderly, disabled resident living on Supplemental Security Income (SSI) payments alone would exceed the poverty threshold for a one-person household as defined above. SSI is a federal program that provides monthly cash payments to elderly and/or disabled people in need. To qualify, a recipient must have little or no income and few resources (less than $2,000 in assets, excluding home and car, for a single individual, or $3,000 for a couple). California adds a small cash supplement to the federal SSI payment in lieu of other benefit programs, such as food stamps. In December 2004, the monthly SSI payment in California, including the standard state supplement, was $889 for a single person living independently. (Source: Social Security Administration, 2016) This would result in an annual income of $10,668, which is $1200 below the poverty threshold defined above.

Further discussions with FHWA staff led to the discovery that other approaches (besides using federal poverty thresholds) have been used and are permitted for Environmental Justice analyses in California. *(Source: Wong-Murillo Personal communication, 2004)* The most recent Caltrans guidance recommends using a more flexible approach and makes reference to a case study in the San Francisco Bay Area that used twice the federal poverty threshold as the criterion, due to the high cost of living in the Bay Area, relative to the rest of the nation. (In that study, low-income population clusters were identified in areas where 30 percent of residents had incomes below twice the federal poverty thresholds.) A factor of 1.5 times the nationwide threshold to adjust for cost of living in Eureka, which is higher than the nation but lower than the San Francisco Bay Area, was used. Using a factor of 1.5 times the nationwide threshold (to adjust for cost of living in Eureka, which is higher than the nation but lower than the San Francisco Bay Area), four of the seven Lazy J households would be considered low income, and at least four of the nine Redwood Coast Cabins and RV Resort households would be considered low income.

Additional information provided by the Lazy J Trailer Ranch management indicated that approximately twenty of the resident households had incomes below 1.5 times the poverty threshold for single person households and/or were dependent solely on SSI payments for income. Another four trailers were occupied by students, at least two of whom receive financial aid from the institutions they attend. This information, combined with field reconnaissance and anecdotal information provided by residents at special outreach meetings described below, indicates that a substantial proportion of the residents living in the Lazy J Trailer Ranch and the Redwood Coast Cabins and RV Resort should be considered to be low income, even though these communities also include some higher income individuals. Other factors considered in determining the special sensitivity of these two populations to project impacts include their isolation from services (groceries, gas, medical care, drugstores and other shopping or community services), the lack of public transit service provided to either location, and the lack of comparable low cost replacement housing resources in the region. Both Lazy J Trailer Ranch and Redwood Coast Cabins and RV Resort were contacted in 2016 and confirmed that the current demographics of the residents are similar to what was found in the surveys for the 2007 Draft EIR/S. For these reasons, the Lazy J Trailer Ranch and Redwood Coast Cabins and RV Resort are considered Environmental Justice communities for the purpose of this analysis.

Manila

2010 census data indicates that 90 percent of Manila's population is White. Therefore, it is not an Environmental Justice community on the basis of race. Reliable income data is extremely difficult to obtain for small areas. Nonetheless, there is 2000 census block data, as well as other indirect, published and anecdotal evidence described below, indicating that Manila residents are predominately low income and therefore should be considered an Environmental Justice community.

In comparing block group data for the Manila-Samoa-Fairhaven area (BG 11-1) with the same data from the 2000 census for the Block Group that encompasses the Lazy J Trailer Ranch (BG 8-3), the economic status of Manila residents appears to be worse. For example, the median household income in BG 11-1 was $29,405, compared to $35,402 in BG 8-3. Furthermore, the percent of the population whose income was less than 1.5 times the poverty threshold (a slightly different measure than FEMA poverty guidelines, but very similar) was 32 percent in BG 11-1, compared to 21 percent in BG 8-3. (Furthermore, BG 11-1 encompasses a subdivision outside of Arcata where there are half-million dollar homes, which would distort the data to make Manila residents appear better off than they really are).

In 2005, the after-school and summer children's recreation program at the Manila Community Center had one hundred children enrolled, 51 of whom are homeless (i.e., have no permanent address, currently living in cars or with friends or relatives). In the Peninsula Union School

District, which serves much of the Samoa Peninsula population, over 90 percent of students qualify for free or reduced-cost lunches under the USDA National School Lunch Program.

Humboldt County completed a Preliminary Redevelopment Report in January 2005 that covers several areas of the county, one of which is the community of Manila. The Report documents blight conditions in the community of Manila and reports the following findings:

- Approximately 75 percent of all housing units in Manila are substandard (67 percent are deteriorated and require rehabilitation; 8 percent are dilapidated);
- More than one-third of all parcels are served by unpaved streets or alleys that are in largely poor condition;
- Almost half of the parcels in Manila have improvement-to-land value ratios of less than 1.0, "testifying to the impaired investments and stagnant property values in the Sub-area;" and
- The community lacks basic amenities such as a grocery store, drug store, or bank.

Based on the above information, Manila was considered a predominately low-income community for the purpose of this analysis.

The community of Manila, on Route 255, is not within the Route 101 corridor. However, since Route 255 is the primary alternate route between Eureka and Arcata, residents from this community have commented that changes to Route 101 could result in increased traffic volumes on Route 255.

ENVIRONMENTAL CONSEQUENCES

None of the project alternatives would displace any members of the identified Environmental Justice populations or divide an established Environmental Justice community, because none would involve any direct takings of residential property. Any one of the Build Alternatives, however, but especially Alternative 1, would result in increased out-of-direction travel distance resulting in disproportionate economic hardship for some Environmental Justice community residents. None of the Build Alternatives would divert traffic to State Route 255 and thus there would not be a disproportionate, adverse effect to residents of Manila.

Alternative 1 includes closing the Route 101 median at Airport Road, which currently is the only left turn access to and from Route 101 for the Lazy J Trailer Ranch residents living on Jacobs Avenue. If the Airport Road median were closed and left turns eliminated, a trip originating at the Lazy J Trailer Ranch to central Eureka would require a driver to make one of two choices:

- Turn right from Airport Road onto Route 101, travel northbound to Indianola Cutoff, travel eastbound to Old Arcata Road and Myrtle Avenue and eventually central

Eureka. The round trip would require an additional eight miles (compared to the existing conditions).

- Turn right from Airport Road onto Route 101, travel northbound, turn around at the Route 101/255 interchange in Arcata, and finally travel southbound to central Eureka. The round trip would require an additional ten miles (compared to the existing conditions). This option is longer than the first option but might be faster in terms of time savings.

A Redwood Coast Cabins and RV Resort resident attempting a round trip to Arcata would not be affected by the median closure at Bracut when proceeding to Arcata; however, the return trip from Arcata would require either driving to Eureka to turn around or using Old Arcata Road and Indianola Cutoff. Alternative 1 would require traveling an additional 3.2 miles (compared to the existing conditions) for a round trip from the Redwood Coast Cabins and RV Resort to Arcata.

Alternative 1A was designed to minimize out-of-direction travel to both residents and businesses by including three turnarounds and partial signalization at Airport Road. Alternative 1A, however, would still result in increased out-of-direction travel/delay resulting in disproportionate economic hardship to the Redwood Coast Cabins and RV Resort, which was determined to be an Environmental Justice community. Alternative 1A includes partial signalization, which would allow left turns to Airport Road from southbound Route 101. However, the signal would not allow left turns from Airport Road to southbound Route 101. In order to travel from Airport Road to southbound Route 101, drivers would need to turn right onto northbound Route 101 and turn around at the turnaround north of Mid-City Motor World intersection. In addition, the signal would not allow bicyclists and pedestrians to cross Route 101. The Airport Road intersection would provide improved access for the Lazy J Trailer Ranch residents living on Jacobs Avenue compared to Alternative 1, but not compared to the existing condition.

A Redwood Coast Cabins and RV Resort resident attempting a round trip to Arcata would not be affected by the median closure at Bracut when proceeding to Arcata; however, the return trip from Arcata would require traveling an additional 2.5 miles to turn around to complete the trip. Alternative 1A would require traveling an additional 5 miles (compared to the existing conditions) for a round trip from the Redwood Coast Cabins and RV Resort to Arcata.

Overall, Alternative 1A would minimize out-of-direction travel for the Environmental Justice communities compared to Alternative 1, but would still result in moderate to substantial adverse effects to both the Lazy J Trailer Ranch and Redwood Coast Cabins and RV Resort Environmental Justice communities.

Alternative 2 would not be as restrictive as Alternative 1, but would still necessitate increased out-of-direction travel resulting in disproportionate economic hardship for two Environmental Justice communities: the Lazy J Trailer Ranch (a mobile home park) and the Redwood Coast Cabins and RV Resort. Under Alternative 2, a trip originating at the Lazy J Trailer Ranch to central Eureka would require turning right from Airport Road onto Route 101, traveling 1.9

miles to the proposed grade separation at Indianola Cutoff, and then turning around to return to Eureka. Alternative 2 would require traveling an additional 3.8 miles (compared to the existing conditions) for a round trip from the Lazy J to Eureka.
When surveyed, Lazy J residents believed Alternative 2 would still create a driving situation that would be too expensive and inconvenient.

Redwood Coast Cabins and RV Resort residents would also benefit from a Route 101/Indianola grade separation since trips originating from Arcata would necessitate traveling south on Route 101, turn around at the proposed grade separation, proceed north on Route 101, and turn right at the Route 101/Bracut intersection to access the Redwood Coast Cabins and RV Resort. A Redwood Coast Cabins and RV Resort resident attempting a round trip to Arcata would not be affected by the median closure at Bracut when proceeding to Arcata; however, the return trip from Arcata would require traveling an additional 2.5 miles to turn around to complete the trip. Alternative 2 would require traveling an additional 5 miles (compared to the existing conditions) for a round trip from the Redwood Coast Cabins and RV Resort to Arcata.

Alternative 3 includes constructing a fully signalized intersection on Route 101 at Airport Road, which would provide direct access between Route 101 and the Environmental Justice community at the Lazy J Trailer Ranch on Jacobs Avenue. However, the County of Humboldt opposes full signalization at Airport Road since full signalization would require using a portion of the County's Murray Field Airport.

Alternative 3 would necessitate increased out-of-direction travel resulting in disproportionate economic hardship for the Environmental Justice community at Redwood Coast Cabins and RV Resort at Bracut. A Redwood Coast Cabins and RV Resort resident attempting a round trip to Arcata would not be affected by the median closure at Bracut when proceeding to Arcata; however, the return trip from Arcata would require traveling an additional 2.5 miles to turn around to complete the trip. Alternative 3 would require traveling an additional 5 miles (compared to the existing conditions) for a round trip from the Redwood Coast Cabins and RV Resort to Arcata.

Alternative 3 would have the least adverse effect to Environmental Justice communities since it provides the best access at the Lazy J Trailer Ranch, which is a much larger community than Redwood Coast Cabins and RV Resort.

Modified Alternative 3A was designed to substantially minimize out-of-direction travel to both residents and businesses by constructing a half signal at Route 101 and Airport Road. Left turns from Airport Road to Route 101 southbound would be allowed; consequently, Modified Alternative 3A would have similar access advantages of Alternative 3 but without taking right-of-way from the County Airport. Modified Alternative 3A, however, would still necessitate increased out-of-direction travel resulting in potential disproportionate economic hardship for the Environmental Justice community at the Redwood Coast Cabins and RV Resort. For more information about out-of-direction travel, refer to Table 3-3 Changes in Round-Trip Travel Distances in Chapter 3, Section 3.1.6.

A Redwood Coast Cabins and RV Resort resident attempting a round trip to Arcata would not be affected by the median closure at Bracut when proceeding to Arcata; however, the return trip from Arcata would require traveling an additional 2.5 miles to turn around to complete the trip (after the Route 101/Bracut median is closed.

Environmental Justice Comparison of Alternatives

Both low income residents and non-low income residents of the Redwood Coast Cabins and RV Resort would be disproportionately impacted by any one of the Build Alternatives because under these alternatives the Redwood Coast Cabins and RV Resort residents would be required to spend considerably more time and money in out-of-direction travel than other residents of the study region. Access impacts to the Lazy J Trailer Ranch would vary depending on the Build Alternative.

Alternative 1 would especially impact Lazy J residents since the other Build Alternatives include features between Eureka and Arcata that would reduce the need to travel to turn around in Arcata. Out-of-direction travel would likely impact residents even more than business owners or patrons (as discussed in Section 3.1.6 - Traffic and Transportation) since many of the residents stated they made numerous trips from their homes to other destinations in Eureka or Arcata, including to drop children at school, shop for essentials, attend meetings and appointments, or visit family members and friends. As documented in the Community Impact Assessment, trailer park residents expressed intense opposition to Alternatives 1 and 2 at special outreach meetings held for this project because of the extreme effect it would have on their time, budget and quality of life. (For more information about out-of-direction travel in terms of access restrictions, see Chapter 3, Section 3.1.6 Traffic and Transportation.)

Because they are predominately low income, those who own vehicles tend to own older and less fuel-efficient vehicles than higher income residents of the study area. Also, because there are very few services (medical clinics and shopping) located within walking distance of these residential areas and because they are poorly served by transit services, the residents are more dependent on travel on the Route 101 corridor to obtain access to basic services. Lazy J Trailer Ranch residents who attended a December 8, 2004 meeting to present Alternatives 1 and 2 commented that the recent increases in gas prices had exacerbated economic hardships for them. Some meeting attendees stated they do not have automobiles and are dependent on biking or taxi service to get to Eureka and Arcata. The added out-of-direction travel that would result from Alternatives 1 and 2 would make biking infeasible and taxi costs considerably higher for Lazy J Trailer Ranch residents. Those with automobiles stated that their gas costs and inconvenience would increase to the point that they would feel forced to move under either Alternative 1 or 2.

Alternative 2 was perceived as not as restrictive as Alternative 1, but would still not be workable for Lazy J residents. They believed that it would still make driving too expensive and inconvenient. “It hurts people on fixed incomes,” one attendee stated. The meeting participants urged Caltrans to consider other alternatives, including signalization at Airport Road, or extension of Jacobs Avenue across the slough into Eureka.

It is clear from the survey data on length of tenure, as well as from comments made by residents, that the people who reside at Lazy J Trailer Ranch want to remain living there, and most have few options because of their limited income. The Lazy J Trailer Ranch charges approximately $200 per month rent to trailer owners. Other parks in the region charge $360 per month or more.

Furthermore, many of the trailers at Lazy J are too old to be accepted at other mobile home parks in the region. Alternatives 1, 1A, and 2 would create another disproportionate economic impact on residents of the Lazy J. For the many residents subsisting on SSI payments, their home is their primary asset. Residents noted that, when they are no longer able to live independently, they plan to sell their home. If the home is located in a trailer park with substantial access restrictions (Alternatives 1, 1A, and 2), they would be unable to sell, or the home value would be substantially reduced. For permanent residents of Redwood Coast Cabins and RV Resort, low-cost living options are also limited.

Even though the No-Build Alternative does not include any proposed roadway changes, traffic volumes and speeds are expected to increase in the foreseeable future, which would likely necessitate closing one or more Route 101 median openings within the corridor. The No-Build Alternative (Alternative 7) would not have a disproportionate impact on Environmental Justice communities in the short term.

In the 20-year planning horizon, however, the No-Build Alternative does have the potential for disproportionate, adverse impacts at the Lazy J Trailer Ranch and Redwood Coast Cabins and RV Resort because collisions could increase at both Airport Road and Bracut intersections if no improvements are made. An increase in the number or severity of collisions may necessitate closing one or more Route 101 intersection median openings within the corridor. Similar to Alternative 1, closing one or more intersection median openings could potentially restrict access to residences.

Table 3-2 summarizes the project alternative effects on the local Environmental Justice populations. The primary impact would be economic, resulting from out-of-direction travel and travel delay; however, the Environmental Justice populations would derive an enhanced safety benefit from any of the Build Alternatives.

Table 3-2 Potential for Disproportionate Adverse Impact on Environmental Justice Populations

Community	Alt 1	Alt 1A	Alt 2	Alt 3	Modified Alt 3A	Alt 7 No-Build
Lazy J Trailer Ranch	Y	Y	Y	N	N	N
Redwood Coast Cabins and RV Resort	Y	Y	Y	Y	Y	N
Manila	N	N	N	N	N	N

No disproportionately high and adverse impacts to the community of Manila were identified under any of the Build Alternatives (refer to appropriate sections of the Final EIR/S for discussion of potential air quality, noise, visual and traffic impacts affecting these Environmental Justice populations). Residents of Manila expressed concern to Caltrans that the Safety Corridor program increased traffic levels through their community on Route 255. Traffic counts confirm there was an initial increase in traffic on Route 255 after the Safety Corridor program was implemented, but eventually traffic diversion to Route 255 decreased and is not predicted to increase under any of the project alternatives. (See Chapter 3, Section in 3.1.6—Traffic and Transportation for more information.)

AVOIDANCE, MINIMIZATION, AND/OR MITIGATION MEASURES

Initially, Alternatives 1, 2, and 3 were proposed in the Draft Environmental Impact Report/Statement. After meeting and discussing access restrictions with local residents and businesses, measures to offset access effects to the two Environmental Justice communities were examined. It was determined that modifying the existing alternatives would provide the most cost effective measure to minimize access restrictions with closing the Route 101 medians.

Alternative 3, which would include full signalization at Airport Road, would avoid closing the Airport Road median opening and consequently avoid impacts to the Lazy J Trailer Ranch residents, but would not benefit the Redwood Coast Cabins and RV Resort residents. The County of Humboldt, however, opposes Alternative 3 since it requires additional right-of-way from the County Airport.

Modified Alternative 3A includes a half signal at Airport Road, which would allow left turns to and from Airport Road to serve businesses and the Environmental Justice Community on Jacobs Avenue. It should be noted that the westbound left turn movement may need to be closed 15 to 20 years after construction as traffic volumes increase. With this in mind, Modified Alternative 3A would operate better than Alternatives 1 and 2 since the remaining signal configuration would still allow left turns from southbound Route 101 to Airport Road; however, traffic intending to travel on southbound Route 101 would need to initially travel 1.83 miles north on Route 101 to turn around at the Route 101/Indianola Cutoff grade separation.

Alternative 1A includes partial signalization at Airport Road. Left turn movements from southbound Route 101 would be controlled by the signal, but left turns from Airport Road to southbound Route 101 would not be allowed. Travelers from Airport Road needing to travel south on Route 101 would need to first turn right on Route 101 and then turn around north of Mid-City Motor World.

The proposed Route 101/Indianola Cutoff grade separation included in Alternatives 1A, 2, 3, and Modified Alternative 3A would lessen out-of-direction travel and delay for Redwood Coast Cabins and RV Resort residents, but would not completely avoid the impact.

Alternatives that would completely avoid impacting Environmental Justice communities were identified and evaluated in the Value Analysis process. Alternatives involving a grade separation at Airport Road or major public transit improvements would either not meet the project need and purpose or would require a high magnitude of wetland impact (see Chapter 2 for more information).

Neither State nor Federal regulations/laws provide compensation for restricting highway access. Because of the potential for disproportionate adverse effects to the Redwood Coast Cabins and RV Resort and Lazy J Trailer Ranch residents, Caltrans would periodically inform residents of the project design and planning process and provide opportunities for additional comment.

In summary, Alternative 3 would have the least adverse effect to the Environmental Justice communities but would have the highest cost ($68 million), and the County of Humboldt opposes the taking of any airport property to construct this alternative. Modified Alternative 3A would be almost as effective at minimizing adverse effects to the two Environmental Justice communities within the corridor and would cost $10 million less than Alternative 3.

While adverse effects to Environmental Justice communities would be unavoidable to construct a project to meet the project need and purpose, the project is needed for public safety enhancement and other roadway improvements that would benefit all travel modes and all travelers.

3.1.5 Utilities / Emergency Services

AFFECTED ENVIRONMENT

There are several utilities crossing Route 101, particularly at the northern project limits within the city of Arcata. Within the proposed project, there is an underground SBC telephone line on the west side of Route 101 and Pacific Gas & Electric gas line equipment on the east side of Route 101 within the Route 101 right-of-way in the Bracut area which may need to be relocated. (See Appendix A, Plan Sheets 14, 15, and 16 for location.) All Build Alternatives include replacing the southbound Jacoby Creek bridge, which has a telephone line attached to it. There are also gas, electrical, and telephone lines outside the existing Route 101 right-of-way which may require relocation to construct the intersection for Alternative 3. All other utilities are expected to remain.

Utilities that do not meet Caltrans highway design policies for longitudinal encroachment located within the Route 101 right-of-way include two existing utility lines near the proposed grade separation at Indianola Cutoff under Alternatives 2, 3, and Modified Alternative 3A:

- 900-feet of eight-inch diameter Pacific Gas & Electric gas main and relocation of eight electrical poles
- 900-feet of SBC underground telephone line

These utilities are not accessible immediately from the highway, therefore would not be relocated as a result of this project.

Other providers of utilities and services that are near, or cross the project corridor, but would not be affected by the project include overhead electrical and cable television lines, a water line and a sewer line.

Emergency service providers

Route 101 is critical for all types of emergency response vehicles since it is a direct, continuous high speed roadway between Eureka and Arcata. The range of emergency services that operate along the Route 101 corridor is typical of any metropolitan area. Services include police and fire protection, as well as ambulance service.

Emergency service providers in the project area include the California Highway Patrol, Humboldt County Sheriff's Department, Eureka Police Department, Arcata Police Department, Humboldt Bay Fire, Arcata Fire Protection District, and the North Coast Emergency Medical Services Agency. In addition, an air ambulance service operates from Murray Field Airport. Many of these agencies have mutual aid agreements to facilitate response to fires, traffic accidents, and other emergencies in the Eureka-Arcata region.

ENVIRONMENTAL CONSEQUENCES

Utilities

All Build Alternatives may require relocating an underground telephone line west of the southbound lanes at the Bracut Industrial Park. In addition, gas line equipment on the east side of Route 101 near the Caltrans Bracut Maintenance station would be relocated. These utilities would likely be placed parallel to their present alignments just outside of the proposed roadway improvements. A telephone line would be attached to the new southbound Jacoby Creek bridge.

Caltrans has provided State cost estimates for the potential utility relocation work. These types of relocations for a roadway construction project are made following standard procedures and would not result in impacts to cultural or biological resources. Utility service disruption would not be anticipated during relocation activities.

Alternative 7, the No-Build Alternative, would not affect existing utilities in the project corridor.

Emergency service providers

Several of the emergency service providers who responded to the Caltrans emergency services survey expressed opposition to the No-Build Alternative because it would do nothing to alleviate the ongoing problem of serious cross-traffic collisions on the Route 101 corridor. They expressed preference for an alternative that would remove at-grade cross traffic from the seven intersections along the corridor and replace it with controlled intersection traffic. They stated that even an increase in response times might be an acceptable trade-off for enhanced safety and reduced potential for collisions along the Route 101 corridor.

Alternatives 2, 3, and Modified Alternative 3A, which include a grade separation at Route 101, are expected to substantially enhance access for emergency service providers compared to Alternative 1. A grade separation would generally provide faster access than the existing intersection since Route 101 would be grade-separated from Indianola Cutoff.

As described in Chapter 3, Section 3.1.6—Traffic and Transportation, short term, temporary disruption to specific intersections and access points along the Route 101 corridor would result during construction of any of the Build Alternatives. However, implementation of the Caltrans Traffic Management Plan for construction would prevent substantial delays to emergency vehicle response times.

Closing the median openings along the Route 101 corridor permanently could adversely affect emergency services by responding agencies, especially those responding to collisions on Route 101 or who use Route 101 to access emergencies in the surrounding area. For example, the Arcata Fire Protection District (AFPD) currently provides fire, medical, hazardous materials and rescue services from Indianola Cutoff north to Samoa Boulevard. AFPD uses the existing Route 101 intersections to access areas along Old Arcata Road and Indianola Cutoff, as well as the Redwood Coast Cabins and RV Resort. *(Source: White, 2003)*

All Build Alternatives would increase out-of-direction travel (and therefore response times) from Arcata to these areas. With mitigation (refer to next subsection), substantial impact would be avoided.

AVOIDANCE, MINIMIZATION, AND/OR MITIGATION MEASURES

Utilities

Utility relocation involving trenching, or any ground disturbing activity within the area of the project roadway construction, would be subject to the appropriate mitigation and minimization measures discussed in other sections of this document. Service disruption would not be anticipated during construction; consequently, mitigation or measures to minimize harm are not required.

Emergency service providers

Two lanes of traffic in both directions on Route 101 would be maintained during peak traffic periods during construction. Caltrans would notify emergency service providers in advance of the proposed construction schedule, temporary access restrictions, and possible detour routes prior to making any access modifications. With such advance notifications, impacts on service providers during construction would not be substantial.

Caltrans is working with emergency response agencies to identify appropriate median openings along the Route 101 corridor that could only be used by emergency vehicles. With emergency access openings in place after construction, impacts on service providers would not be substantial.

3.1.6 Traffic and Transportation

The traffic section discusses the project's potential effects on local and regional traffic and circulation, during construction (construction impacts) and after completion of the project (long-term impacts).

REGULATORY SETTING

The Federal Highway Administration (FHWA) directs that full consideration should be given to the safe accommodation of pedestrians and bicyclists during the development of federal-aid highway projects. It further directs that the special needs of the elderly and the disabled must be considered in all federal-aid projects that include pedestrian facilities. When current or anticipated pedestrian and/or bicycle traffic presents a potential conflict with motor vehicle traffic, every effort must be made to minimize the detrimental effects on all highway users who share the facility.

In July 1999, the U.S. Department of Transportation (USDOT) issued an Accessibility Policy Statement pledging a fully accessible multimodal transportation system. Accessibility in federally-assisted programs is governed by USDOT regulations (49 CFR part 27) implementing Section 504 of the Rehabilitation Act (29 USC 794). FHWA has enacted regulations for the implementation of the 1990 Americans with Disabilities Act (ADA), including a commitment to build transportation facilities that provide equal access for all persons. These regulations require application of the ADA requirements to Federal-aid projects, including Transportation Enhancement Activities.

AFFECTED ENVIRONMENT

The Eureka-Arcata Route 101 Corridor is one of the most heavily traveled roadway segments in Caltrans District 1—an area that encompasses Del Norte, Humboldt, Mendocino and Lake counties. Between Eureka and Arcata, the average annual daily traffic on Route 101 is currently about 39,000 vehicles per day. Route 101 currently consists of four-lanes (two-lanes in each direction) between Eureka Slough bridge (in Eureka) and Gannon Slough bridge (in Arcata) with a posted 50 mph speed limit. Vehicle headlights are currently required to be on 24 hours a day in this segment of the corridor. North of the Gannon Slough bridges in Arcata, the expressway changes to a four-lane freeway with a posted 65 mph speed limit. Except for emergency parking, vehicle parking is prohibited along Route 101 in both directions within the project limits (between Eureka Slough bridge and the 11^{th} Street overcrossing in Arcata). The existing Route 101 expressway segment has the following dimensions:

- Four traffic lanes (two lanes each direction);
- One twelve-foot wide and one 11-foot wide traffic lane in each direction;
- 22- to 80-foot wide median separating the northbound and southbound lanes;
- 4-foot wide paved inside shoulders;
- 10-foot wide paved outside shoulders.

There are currently seven at-grade Route 101 local street/driveway access locations within the expressway segment of Route 101 between Eureka and Arcata. Six of these access locations currently have Route 101 median crossings that allow for left turn on and off movements to and from the local streets/driveways. (Note that at Route 101 and Cole Avenue, the Route 101 median opening was closed in 2003 at this location. A right turn off northbound Route 101 and right turn onto Route 101 is permitted. Cole Avenue connects to businesses and residents on Jacobs Avenue. Airport Road is the only other road that provides access to Jacobs Avenue.)

From south to north, the six at-grade median crossings consist of:

- ***Airport Road*** **–** The Route 101 median is currently open and all turn movements to and from Route 101 at this intersection are permitted. The deceleration and acceleration lanes at this intersection were extended in 2003. Of the six at-grade median crossing locations, only the Airport Road intersection has acceleration and deceleration lanes that do not need improving. Airport Road connects to businesses and residents along Jacobs Avenue. Cole Avenue is the only other road that provides access to Jacobs Avenue.

- ***Mid-City Motor World* –** The Route 101 median at this intersection is currently open and all turn movements to and from Route 101 at this intersection are permitted. The Mid-City Motor World driveway does not connect to any other local streets.

- ***California Redwood Company* –** The Route 101 median is currently open and all turn movements to and from Route 101 at this intersection are permitted. This driveway does not connect to any other local streets.

- ***Indianola Cutoff* –** The Route 101 median is currently open and all turn movements to and from Route 101 at this intersection are permitted. Indianola provides access to local businesses and residents and connects to Old Arcata Road.

- ***Bracut* –** The Route 101 median is currently open and all turn movements to and from Route 101 at this intersection are permitted. The driveways on either side of Route 101 at Bracut do not connect to any other local streets.

- ***Bayside Cutoff* –** The Route 101 median is currently open and all turn movements to and from Route 101 at this intersection are permitted. Bayside Cutoff connects to Old Arcata Road to the east and provides access to residents and businesses on Old Arcata Road.

See Figure S-3 (in Summary section) and Plan Sheets in Appendix A for the location of these intersections. Most of these intersections (except Bracut and the California Redwood Company on the west side) have existing acceleration and deceleration lanes that facilitate entering and exiting the expressway at each intersection.

Existing Route 101 Alternate Roads

In addition to Route 101, two other roads that link Eureka and Arcata are Old Arcata Road to the east and State Route 255 to the west. Potential project impacts to all three roads were evaluated and summarized in the Environmental Consequences section. Between the intersection of Routes 101 and 255 in Eureka to the intersection of Routes 101 and 255 in Arcata, the three routes have the following characteristics:

- Route 101 is approximately six miles between the Eureka Slough bridge and the Route 101/255 interchange in Arcata. The expressway segment of Route 101 has a posted speed limit of 50 mph. North of Gannon Slough bridge, the posted speed limit is 65 mph. Of the three roads, Route 101 is the most direct, is designed to carry high traffic volumes and large commercial trucks, has relatively high posted speed limits, and has the fewest residences adjacent to the roadway.

- State Route 255 is 8.8 miles between Eureka and Arcata with a posted speed limit ranging from 35 mph to 55 mph. This route passes through the residential community of Manila. There are no direct roadway linkages to Route 101 other than at the intersections in Eureka and Arcata. Averaged over the ten years since the start of the

Safety Corridor in 2002, traffic volumes on State Route 255 have increased by approximately 20 percent in the Manila area and decreased by approximately 1 percent within the city of Arcata. In April 2012, the average critical speed through Manila on State Route 255 was measured at 58 mph, which represents no significant change from average speeds measured in 1997 and 2002 through 2012. *(Source: Caltrans District 1, 2012 Eureka-Arcata Safety Corridor Ninth/Tenth-Year Report, no date)*

- Old Arcata Road is approximately 10.5 miles between Eureka and Arcata and extends through mostly residential and rural areas. Between Hall Avenue in Eureka and Jacoby Creek Road in the Bayside area, the posted speed limits are 35 mph and 45 mph respectively. Indianola Cutoff and Bayside Cutoff are the only roads connecting Route 101 and Old Arcata Road. Averaged over the ten years since the start of the Safety Corridor in 2002, traffic volumes on Old Arcata Road have decreased by approximately 2 percent along the length of the road. County of Humboldt speed surveys verified that average critical speeds approximate the posted speed limits. In 2008, a roundabout was installed at Indianola Cutoff and Old Arcata Road, which substantially reduced traffic speeds in the vicinity of this intersection. *(Source: Caltrans District 1, 2012 Eureka-Arcata Safety Corridor Ninth/Tenth-Year Report)*

Safety Corridor

Implementation of the Safety Corridor on Route 101 between the Eureka Slough bridge and Gannon Slough bridges was completed in May 2002 as an interim solution for the Eureka-Arcata Corridor Improvement project. Principal elements of the Safety Corridor consist of engineering components and an enhanced traffic law enforcement period. The engineering components include the following:

- Signage identifying this road segment as a Safety Corridor
- Reduction of the posted speed limit from 60 to 50 mph
- Addition of radar speed detection signs
- Daylight headlight section signing
- Modified stop signs at public road intersections with flashing red lights
- Addition of yellow flashing beacons on Route 101 in advance of public road intersections
- Addition of permanent changeable message signs on public roads in advance of stop signs (to display caution messages)
- A Highway Advisory Radio station (no longer in place).

The safety awareness activity period, no longer in existence, included enhanced traffic law enforcement and increased public education with safety tips on television, radio, and print media. The double traffic fine zone ended in January 2006.

Transportation Modes

The Eureka-Arcata Corridor currently accommodates a number of different transportation modes:

- Murray Field is a small public airport with one runway and no control tower. The Airport is located north and east of the Route 101/Airport Road intersection. Airport Road provides the only surface road access to the airport.

- The Northwestern Pacific Railroad is adjacent to, and west of Route 101 between Eureka and Arcata. This railway segment has experienced limited use in recent years since much of the line has been inoperative because of infrastructure damage. The future operation of this railroad to haul passengers or freight remains uncertain.

- Redwood Transit System (RTS) provides commuter bus service between Eureka and Arcata as well as destinations further south and north. There are no bus stops within the Route 101 project limits between Eureka and Arcata. The RTS is part of the Humboldt Transit Authority (HTA).

A general representation of transportation work/commute mode composition for Humboldt County, not just the Eureka-Arcata area, is summarized below. This summary excludes college student commuting, shopping trips, and other non-work travel.

- Drove a car alone: 38,710 (72%)
- Carpooled: 7,056 (13%)
- Bus or trolley bus: 527 (1%)
- Subway or elevated: 6 (0%)
- Railroad: 3 (0%)
- Taxi: 29 (0%)
- Motorcycle: 70 (0%)
- Bicycle: 895 (2%)
- Walked: 3,492 (6%)
- Other means: 245 (0%)
- Worked at home: 3,001 (6%)

(Source: City-Data, 2015)

Bicycles and Pedestrians

Within the project limits, Route 101 is a four-lane expressway and freeway between the Eureka Slough bridge and 11th Street overcrossing. Bicycle travel on Route 101 is much more frequent between Eureka and Arcata compared to State Route 255 and Old Arcata Road, which are two alternate route options but less direct compared to Route 101. The distance on State Route 255 from the intersection of Routes 101 and 255 in Eureka to the intersection of Routes 101 and 255 in Arcata is approximately 8.8 miles. The distance between these two intersections on Route 101 is 6.3 miles.

The route on Old Arcata Road between Eureka and Arcata is less direct, approximately 10.5 miles, compared to both Route 101 and State Route 255.

Caltrans classifies the existing Route 101 corridor on-shoulder bike route as a Class III Bikeway that “designates a preferred bike route through a high demand corridor and provides for shared use with motor vehicle traffic.” The right, or outside, highway shoulder width in both directions is 10 feet wide for the length of the corridor (project limits). The outside shoulders on the existing Jacoby Creek and Gannon Slough bridges are 8 feet wide.

On Route 101 between the Eureka Slough bridges to the south and the Route 101/255 interchange in Arcata, there are no existing pedestrian crossing elements that allow pedestrians to cross Route 101 such as traffic signals, pedestrian crosswalks/warning signs, pedestrian bridges, or pedestrian tunnels. Within the project limits in Arcata, there are walkways that cross Route 101 at 7th Street, and 11th Street. In Eureka, the nearest designated pedestrian crossing of Route 101 is at V Street. The northbound Eureka Slough bridge has a walkway used by both pedestrians and bicyclists. Although pedestrian access is generally allowed on Route 101 between Eureka and Arcata, pedestrian activity on Route 101 is infrequent north of Jacobs Avenue/Airport Road.

While it is legal to ride a bicycle on the Route 101 shoulder, the City of Eureka, City of Arcata, County of Humboldt, and local bicycle organizations advocate for a separated non-motorized vehicle path between Eureka and Arcata. Trail advocates often cite that the existing Route 101 shoulders are unprotected from fast moving motor vehicles.

The 2012 Humboldt Bay Area Bike Map prepared by the Redwood Community Action Agency (RCAA) designates Route 101 from the Route 101/255 intersection in Eureka to the Eureka Slough bridges as “Technical - Due to narrow or non-existent shoulder, high traffic volumes and speeds, extreme topography, and/or poor pavement conditions, these facilities typically challenge skilled riders.” Between the Eureka Slough bridges to the Route 101/255 interchange in Arcata, Route 101 is designated as an “Intermediate Undesignated Roadway” bicycle route. From the Eureka Slough bridges to the Bayside Cutoff. Intermediate Undesignated Roadways are described in the map as “Roads, streets, and highways appropriate for bicyclists with a range of skill levels.” From the Bayside Cutoff, the “Intermediate Undesignated Roadway” route designation then extends to Old Arcata Road and north into Arcata.

North of the Gannon Slough bridges, Route 101 makes a transition to a freeway with a posted 65 mph speed limit and bicycle use is less frequent since there are local road alternatives parallel to Route 101 through Arcata.

Humboldt County's Framework Plan describes bicycle use of the existing transportation system as follows:

> Bicyclists can use all state, county and city roads. Bicycle Route signs have been placed on the State's Bikecentennial Route (now called the Pacific Coast Bike Route or PCBR). The cities of Eureka, Arcata, and Fortuna all have adopted bicycle master plans. The City of Eureka has adopted a bicycle plan and is seeking funds for implementation. Humboldt County has developed a countywide bicycle plan that proposes to connect the cities, towns and colleges and provide safe access to local, regional, State and Federal parks. *(Source: Humboldt County Planning and Building)*

Bicycle activist individuals and groups have advocated for the creation of a separate bikeway (Class I bikeway), but creating a separate pathway for bicycles is constrained by wetlands, a railroad line adjacent to Route 101, areas zoned Agriculture, wildlife refuges, and Humboldt Bay. HCAOG, in association with other public agencies and organizations, has been meeting to discuss the feasibility of a separate multi-use trail between Eureka and Arcata. HCAOG prepared the *Humboldt County 2006 Regional Transportation Plan Update.* This document includes a proposed non-motorized trail along the east side of Humboldt Bay. The primary options include locating the trail on, or adjacent to, the existing North Coast Railroad bed (parallel and west of the existing Route 101 roadway).

This trail, if constructed, would become part of the California Coastal Trail (CCT). The CCT is a network of public trails for walkers, bicyclists, equestrians, wheelchair travelers, and others along the entire California coastline. (See Figure 3-4.) It is currently about two-thirds complete. *Completing the California Coastal Trail*, prepared by the California Coastal Conservancy in 2003, includes the following recommendation: "Support implementation of the *Humboldt Bay Trails Feasibility Study* to develop a continuous trail system around the east side of Humboldt Bay." The *Humboldt Bay Trails Feasibility Study,* prepared for HCAOG, was finalized in 2007. In 2007, AB 1396 changed to Public Resource Code requiring the Coastal Conservancy and Department of Transportation to coordinate together on the Coastal Trail.

At the time this Final EIR/S was prepared, the City of Arcata planned to construct a segment of Class I bicycle trail adjacent to the railroad tracks (west side of Route 101) between Bracut and State Route 255 in Arcata, and the County of Humboldt was planning to extend the Arcata bicycle trail south to X Street in Eureka.

Caltrans is committed to comply with a California Coastal Commission condition to ensure the Arcata and Humboldt Bay trails are constructed:

> *Construction of the Route 101 Corridor Improvements will not commence until adequate commitments are in place to assure that a separate Class 1 bike and pedestrian trail, parallel to Route 101 from Arcata to the northern end of downtown Eureka, will be constructed and operational by the time the major project components are completed.*
>
> *(Source: CCC, 2013)*

The Class 1 bike trail is sponsored by the City of Arcata and the County of Humboldt. These agencies are in the process of designing, permitting, and seeking funding separate of any participation by Caltrans. Likewise, Caltrans is pursuing the Corridor Project independently of the trails project. Caltrans may also assist the local agencies with funding mechanisms under a separate authorization, if requested.

Current bicycling conditions at Route 101 intersections. The 2012 RCAA Humboldt Bay Area Bike Map designates the Route 101 intersections at Mid-City Motor World, Indianola Cutoff, Bracut, and Bayside Cutoff as well as the Route 101/255 interchange in Arcata "Difficult Intersections – Use caution in these areas." Currently, bicyclists seeking to turn left or turn around on Route 101 must make the following maneuvers:

1. Starting from the outside roadway shoulder, cross two lanes of highway traffic; approaching the median, bicyclists may need to watch for vehicles turning left across or crossing Route 101 from different directions depending on the intersection;

2. Wait in the unprotected median between the southbound and northbound Route 101 lanes for an adequate gap in traffic; within the median, bicyclists need to avoid traffic turning left or crossing traffic from up to six different possible vehicle paths, depending on the intersection;

3. Cross two lanes of oncoming traffic to access the opposite outside shoulder.

Bicyclists seeking to turn left from Airport Road, Mid-City Motor World, California Redwood Company, Indianola Cutoff, Bracut, and Bayside Cutoff onto Route 101 must wait for gaps in two traffic lanes and also wait in the unprotected median for an opportunity to cross two remaining traffic lanes. See Figure 1-3 in Chapter, 1 which shows conflicting vehicle travel paths at the existing Route 101/Bracut intersection.

Negotiating the at-grade crossings is noted to be "a challenge by cyclists." *(Source: Redwood Community Action Agency, 2001)* Bicyclists traveling on Route 101 must watch and wait for a suitable gap in motor vehicle traffic flow before crossing the existing acceleration and deceleration traffic lanes. Crossing or turning left at these intersections can be especially intimidating for bicyclists during weekday afternoon peak traffic periods. Motor vehicle speeds can vary, which further complicates crossing traffic lanes.

Most commuting bicyclists tend to ride between Eureka and Arcata and not cross or turn left across Route 101 because there are relatively few destinations along Route 101 between the two cities. Recreational bicyclists on Route 101 are not likely to cross or turn left since there are no public coastal/bay access points between Eureka and Arcata.

Bicycle and Pedestrian Count Data. Between August 13 and 16 (Friday through Monday) in year 2010, bicyclist and pedestrian counts were made during daylight hours at the intersection of Route 101 and Indianola Cutoff. A total of 63 bicyclists were counted by combining the August 13 Friday afternoon count with the August 16 Monday morning count. On Saturday, August 14 there were 57 bicyclists counted. A total of 10 pedestrians were counted during the four day period. *(Source: Humboldt County Association of Governments, 2011)*

RCAA (with funding from the North Coast Unified Air Quality District) completed a Humboldt Bay Area Bicycle Use Study in 1999. This study looked at both intra- and inter-city bicycling behavior in the Eureka-Arcata region. Volunteers were used to count cyclists, as well as to gather data on such issues as helmet use and behaviors such as biking against the flow of traffic. The study found that most Arcata-Eureka bicycle travel occurs on Route 101, with an average of 33 riders per day midweek and an average of twenty riders per day on Saturdays. Based on this data, the study concluded that the Route 101 corridor is used more for commuting than for recreational riding. Bicyclists were found to be more active in the spring, summer, and fall months, but were also documented in appreciable numbers during the rainy winter months. *(Source: Redwood Community Action Agency, 1999)*

Bicycle and Pedestrian Collision Data. Between May 19, 2002 and June 30, 2009, there were eleven reported collisions involving bicycles and three collisions involving pedestrians on Route 101 between the north end of Eureka Slough bridge to the 11th Street overcrossing in Arcata. One bicycle collision occurred at the Mid-City Motor World intersection and two collisions occurred at the Indianola Cutoff intersection. *(Source: Caltrans Accident Summary EASC Bicycles 02-09 from Traffic Accident Surveillance and Analysis System Selective Accident Record Retrieval, no date)*

Bicycle Safety Awareness. Caltrans is actively involved in promoting and educating bicycle safety awareness as well as bicycle touring and bicycle commuting within the North Coast region. For example, Caltrans helps organize and participates in the Annual Bike to Work Day events in Humboldt County.

In 2008, several bicycle awareness signs were posted in both directions within the Route 101 corridor between Eureka and Arcata. These signs were designed to alert motorists to the presence of bicyclists riding on Route 101.

In 2010, rumble strips were installed along the outside shoulders of Route 101 to alert vehicle drivers if they drift beyond the lane. The rumble strips would also be audible to bicyclists and alert them that a motor vehicle was drifting onto the shoulder. Prior to 2008, there were 8-foot wide outside shoulder segments. In 2014, the Route 101 inside through traffic lanes were restriped from 12 feet wide to 11 feet wide and the inside shoulders were reduced from 5 feet wide to 4 feet wide to provide consistent 10 foot wide outside shoulders. The extra width enhances bicyclist safety—especially when there are motor vehicles parked along the shoulder. (Note: Only emergency parking is permitted along the Route 101 corridor between Eureka and Arcata.) In addition, the outside shoulders were colorized to visually reinforce the distinction between the lanes (travel way for motorists) and the shoulder for bicyclists. The narrow lanes, narrow inside shoulders, colorized pavement, and rumble strips function collectively as traffic calming features to discourage drivers from exceeding the posted speed limit.

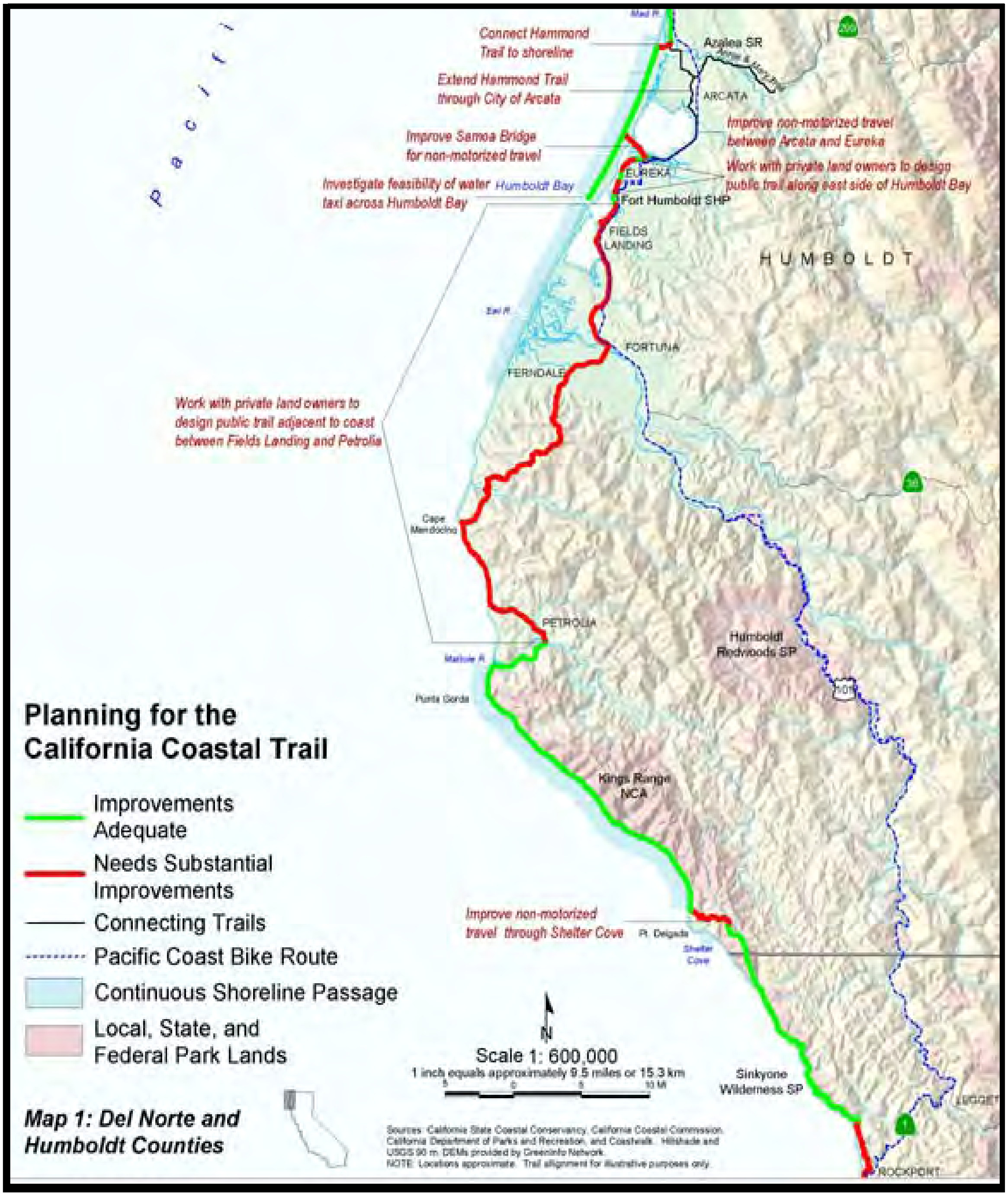

Figure 3-4 California Coastal Trail

ENVIRONMENTAL CONSEQUENCES

This Environmental Consequences section begins with a discussion of the computer traffic forecast model, which was used to evaluate the effects of the project alternatives on the transportation system in the year 2041. A discussion of project alternatives, in terms of meeting the need and purpose of enhancing safety and traffic operations, follows the traffic model discussion. The traffic operations discussion compares the existing highway condition with the predicted 2041 design year traffic Level of Service (LOS) for all alternatives. Next is a discussion of project alternatives in terms of affecting other transportation modes—including bicycling. The No-Build Alternative would include the Safety Corridor (described in Chapter 2). Finally, the Environmental Consequences section concludes with a discussion of potential long term effects and temporary project construction issues.

Traffic Forecast Model and Alternatives Evaluation Report

Various traffic evaluation studies were prepared to evaluate project alternatives in terms of future traffic conditions within the Eureka-Arcata Route 101 Corridor, as well as potential project effects to the local road network, State Route 255, and Old Arcata Road. State Route 255 and Old Arcata Road are alternate north-south routes connecting Eureka and Arcata. The forecast model work summarized in the Caltrans 2005 Traffic Evaluation Report created the framework for subsequent traffic studies. Two subsequent traffic studies were prepared in 2014 because alternatives were modified and traffic data needed to be updated. Two subsequent memos were prepared in 2016 confirming the traffic modeling is still accurate. Traffic study findings summarized in this section are available for review at the Caltrans District 1 Office in Eureka.

Traffic Forecast Model Development

The Microsimulation Traffic Model was used to evaluate five project Build Alternatives and the No-Build Alternative in terms of change in the traffic volumes on alternate routes, traffic LOS (see Appendix B), and out-of-direction travel delay. Year 2041 traffic model forecast projections are based on initial traffic modeling results (using a growth rate of 1.3 percent per year) and updated using year 2010 and 2011 traffic volumes. The Highway Capacity Software Version 5.6 (from the 2010 Highway Capacity Manual) was used to calculate the LOS for turn movements.

Eighteen zones were chosen to represent the origin and destination of travel within the Eureka-Arcata area road network and are connected by links (refer to Figure 3-5 from the Caltrans November 2005 Traffic Evaluation Report). The vehicles travel between the zones using links, which represent the various roadway segments between intersections. The links are primarily defined by lane width, median width, speed limit, and urban, suburban, and rural roadway classification.

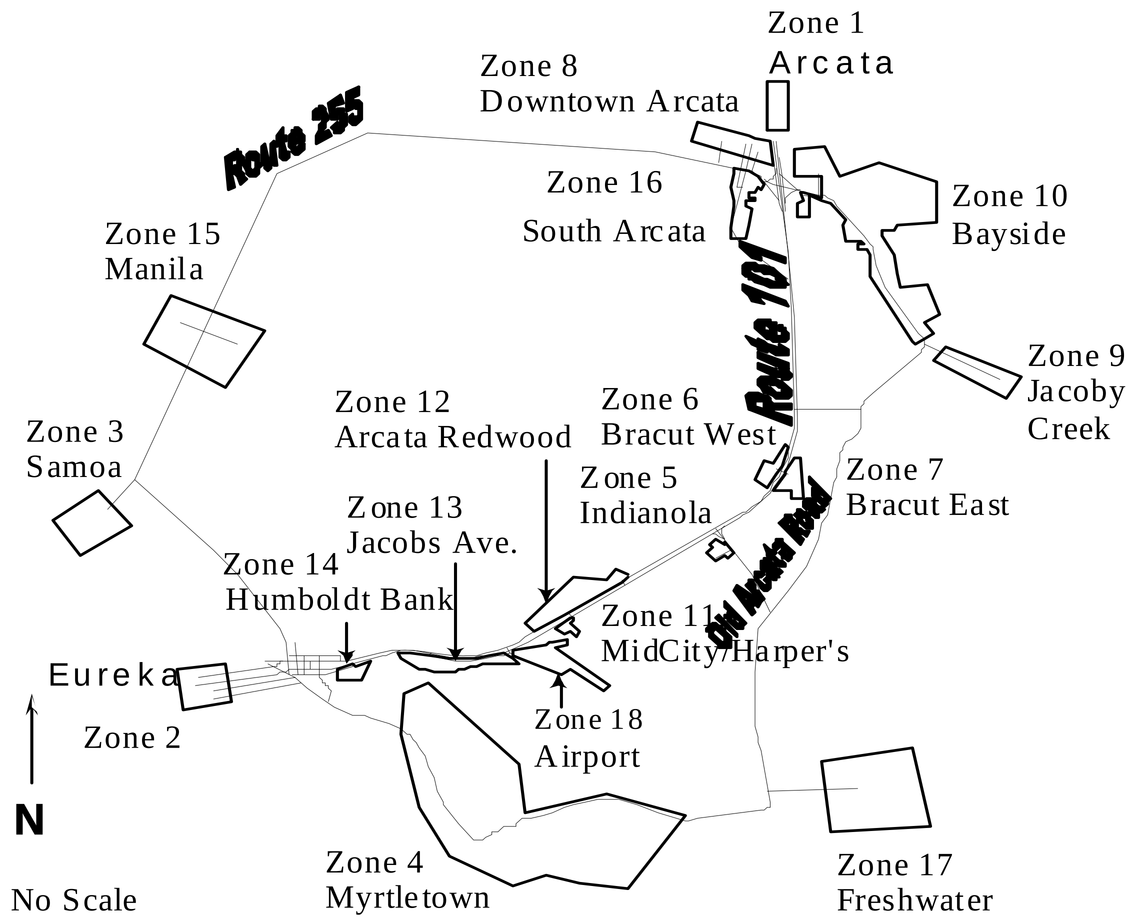

Figure 3-5 Traffic Model Map with Zones and Locations

Out-of-Direction Travel Distance

Eliminating uncontrolled left turn movements at Route 101 intersections is the single most important project feature to improve traffic safety and traffic Level of Service. However, for all Build Alternatives, would restrict left turn out-of-direction travel distance. Out-of-direction travel distance is defined as the increased distance traveled for trips made from trip origin to one trip destination due to changes to the existing highway. All Build Alternatives include Route 101 median closures, which would restrict access at local intersections resulting in out-of-direction travel and delay. The increased out-of-direction travel distance is determined by the difference in distance traveled for all Build Alternatives compared to the existing highway (without median closures). Table 3-3 shows the out-of-direction travel distance in miles calculated for round trips within the Eureka-Arcata Corridor that would be affected by median closures.

Table 3-3 accurately shows the changes in out-of-direction travel for the Build Alternatives compared to the existing situation (independent of existing or predicted future traffic volumes) since this table is only comparing distances.

Table 3-3 Changes in Round-Trip Travel Distances Compared to Alternative 7 (No-Build)

Trip Description See Figure 3-5 for locations	**Alternatives (Additional out-of-direction distances in miles compared to the No-Build)**				
	1	**1A**	**2**	**3**	**Modified 3A***
Eureka Zone to Airport Road Zone	10.0**	2.3	3.7	0.0	0.0 / 3.7
Eureka Zone to Mid-City Motor World Zone	9.0**	1.3	2.6	2.6	2.6
Eureka Zone to Arcata Redwood Zone	8.0	2.9	1.7	1.7	1.7
Eureka Zone to Indianola Zone	6.3	1.3	0.0	0.0	0.0
Eureka Zone to Bracut East Zone	4.9	4.9	4.9	4.9	4.9
Eureka Zone to Bracut West Zone	4.9	4.9	4.9	4.9	4.9
Arcata Zone to Bracut West Zone	7.9	2.7	1.4	1.4	1.4
Arcata Zone to Bracut East Zone	7.9	2.7	1.4	1.4	1.4
Arcata Zone to Indianola Cutoff	4.9	1.3	0.0	0.0	0.0
Arcata Zone to California Redwood Company Zone	4.9	2.0	4.9	2.0	2.0
Arcata Zone to Mid-City Motor World Zone	3.9	1.0	3.9	1.0	1.0
Arcata Zone to Airport Road Zone	2.9	0.0	2.9	0.0	0.0

* Modified Alternative 3A includes a half signal at Route 101 and Airport Road which allows left turns to and from Route 101. Between 15 years and 20 years after construction of the signal, the projected increased volume of traffic on Route 101 would require that the phase for the westbound left turn movement onto southbound Route 101 be abandoned or discontinued. As a result, the southbound left turn from Route 101 would be the only allowed turning movement in 15 to 20 years. For this reason, this table includes 0 miles while the left turn signal phase is in operation and 3.7 miles of out-of-direction travel distance without left turns from Airport Road to southbound Route 101.

**These distances reflect traveling to the 101/255 interchange in Arcata to turn around. Alternatively, drivers returning to Eureka from Jacobs Avenue/Airport Road or Mid-City Motor World may choose to use Indianola Cutoff, travel east to Old Arcata Road and then south on Myrtle Avenue to Eureka. The round trip would be shorter by one to two miles compared to turning around in Arcata, but would likely require more travel time.

Table 3-3 indicates Alternative 1 would result in the greatest out-of-direction distance for travelers because all Route 101 medians at intersections would be closed without any improvements to off-set the median closures. Alternatives 1A, 2, 3, and Modified 3A would have less out-of-direction travel effects because these alternatives include features to improve access.

Basically it would not be feasible to completely avoid out-of-direction travel if uncontrolled left turn movements were eliminated. Improvement options to prevent out-of-direction travel resulting from left turn restrictions included: signalize all intersections, build multiple interchanges, and construct connecting frontage roads. All were evaluated and found to be non-feasible because of high cost and environmental impacts. For more information, refer to Chapter 2.

Even though the No-Build Alternative does not include any proposed roadway changes, traffic volumes are expected to increase in the foreseeable future, which may necessitate closing one or more Route 101 intersection median openings within the corridor to enhance safety. Closing one or more intersection median openings could potentially restrict access to businesses and residences, which could result in out-of-direction travel and delay that would be similar to Alternative 1.

Project Purpose – Safety

One of most important components of the project purpose is to reduce the number of fatal plus injury collisions at each Route 101 intersection to below the statewide average of fatal plus injury collisions for both existing traffic conditions and projected year 2041 traffic volumes. Constructing any one of the Build Alternatives would substantially improve both immediate and long term safety benefits by eliminating the existing left turn conflict potential at Route 101 median crossings. The number of fatal plus injury collisions of a proposed alternative is estimated by multiplying the collision rate of similar facilities statewide by the projected year 2041 traffic volumes. Statewide average collision rates are dependent on the intersection type and location (rural, suburban, or urban). The existence of the Safety Corridor was not considered in modeling projected collision rates since the Safety Corridor signage would be removed as part of project construction. Implementation of the Eureka-Arcata Safety Corridor on traffic operation and safety are discussed separately later in this section.

Signalizing one or more intersections alone would not effectively meet the project need and purpose of enhancing safety and improving traffic operations. (See Alternatives Considered but Eliminated From Further Discussion in Chapter 2 of this document.) However, three of the Build Alternatives include partial or full signalization at Airport Road to improve access. Modified Alternative 3A includes a half signal which allows left turn movements to and from Route 101 at Airport Road. Alternative 1A includes partial signalization at Airport Road, similar to Modified Alternative 3A, except left turn movements from Airport Road to southbound Route 101 would not be allowed. Alternative 3, which includes full signalization at Route 101 and Airport Road, requires realigning the Airport Road intersection due to the close proximity of the intersections of Airport Road/Route 101 and Airport Road/Jacobs Avenue. When comparing current statewide average collision rate groups, the Safety Conformance Criterion (see Chapter 1) is not met with the installation of a traffic signal (included under Alternatives 1A, 3, and Modified Alternative 3A). It is possible, however, to reduce collision rates at signalized intersections with the addition of carefully planned and appropriately-designed collision modification factors. Features such as rumble strips, ITS (Intelligent Transportation System) technology (e.g,. electronic warning message signs), and Red Light Run Photo Enforcement, if supported and funded by the City of Eureka, could be factors used at this location to meet the Safety Conformance Criterion. Red Light Run Photo Enforcement has been proven to be effective at improving driver compliance with traffic control devices (Report 500 National Cooperative Highway Research Program, Volume 12: *A Guide for Reducing Collisions at Signalized Intersections*.)

Turnarounds and Alternative 1A

Alternative 1A includes three turnarounds (or U-turns) to provide alternate access after closing all median openings to a grade separation. Two of the turnarounds would provide northbound to southbound traffic movements: one north of the California Redwood Company intersection and the other at Bracut. One turnaround would provide a southbound to northbound traffic movement south of the Indianola Cutoff intersection. The turnarounds would require widening and realigning the roadway. (See the plan sheets in Appendix A for a visual depiction of the turnarounds.) The locations of the proposed turnarounds would be spaced apart to provide sufficient weaving distances for traffic safety and optimal traffic flow operation.

The turnarounds would allow traffic, including large commercial trucks, to turn around on Route 101 after median openings and left turn opportunities are eliminated. Traffic merges to and from the U-turns would occur within the left lanes. For example, if Alternative 1A was constructed, drivers exiting Mid-City Motor World and wanting to travel south on Route 101 would first need to turn right onto northbound Route 101, move to the far left lane, enter the turnaround in the median, make the U-turn, and finally enter the southbound Route 101 lanes.

Alternative 1A was evaluated and found to meet the safety objective of the project need and purpose, both immediately after construction and 20 years after construction.

Overall, all Build Alternatives would meet the immediate and long term safety objective of the project need and purpose. However, Alternatives 2, 3, and Modified Alternative 3A, which include a grade separation at Indianola, would provide the safest, most reliable service for all transportation modes at Indianola Cutoff and Route 101.

Safety Corridor

The Safety Corridor is included in this section because Alternative 7 (No-Build) includes many of the existing Safety Corridor elements. Although the Eureka-Arcata Safety Corridor has been very effective in reducing overall collisions, and collisions at some of the at-grade median crossings, the intersection injury collision rates at both Mid-City Motor World and Indianola Cutoff remain at over twice the expected statewide averages.

The traffic model evaluates different route choices by assessing the typical driver cost (in terms of travel time) on each route. It does not evaluate driver behavior based on safety education or enforcement. Further, statewide average collisions do not consider the presence of a safety corridor. To assess the anticipated effects of the Safety Corridor as a permanent alternative, a review of other safety corridors within the state was completed.

Thirty-eight safety corridors were identified in California with 29 of them having collision data prior to their establishment, during the enhanced enforcement period, and after the period ended. These 29 corridors are considered in this report. Twenty corridors are two-lane conventional highways, four are four-lane expressways, and one is a combination of two-lane conventional and four-lane expressway. One corridor is a combination of two-lane conventional and four-lane freeway, two are strictly four-lane freeway, and one is a combination of four-lane and six-lane freeway.

Fatal plus injury collision data for each safety corridor on the study was obtained from the Caltrans Traffic Accident Surveillance and Analysis System (TASAS) for five years before the enhanced enforcement period phase, during the enhanced enforcement period, and five years after (where available).

The average intersection fatal plus injury collision rate before, during, and after the enhanced enforcement period for all 29 safety corridors was reduced with the implementation of the enhanced enforcement period, dropping from 0.169 to 0.145 collisions per million vehicles (14 percent). Following the end of the enhanced enforcement period, the fatal plus injury collision rate increased to nearly the same levels as before, rising from 0.145 to 0.163 collisions per million vehicles (13 percent). The enhanced enforcement period duration was from one to three years. Seventy-six percent of the safety corridors had an enhanced enforcement period of either one or 1.5 years. Average daily traffic ranged from 1,300 to 65,300 vehicles per day.

In the study, 15 safety corridors had corresponding safety improvement projects in progress during the enhanced enforcement period. To measure the effectiveness of constructing these improvement projects during or after the enhanced enforcement period, the collision data was separated into one group with a project and another without. The average intersection fatal plus injury collision rate before, during, and after the enhanced enforcement period for safety corridors without a concurrent project decreased from 0.146 to 0.094 collisions per million vehicles (35 percent) with the implementation of the enhanced enforcement period. This reduction corresponds to a net decrease in the intersection fatal plus injury collision rate of 9 percent from the original condition before the Safety Corridors.

Following the end of the enhanced enforcement period, intersection fatal plus injury collision rates increased from 0.094 to 0.155 collisions per million vehicles (65 percent). This rate represents a net increase of 7 percent over the original condition before the safety corridors. The enhanced enforcement period duration was between one and three years.

Of the 29 safety corridors evaluated, one secured additional funding to maintain the enhanced enforcement phase in place: Highway 17 in Santa Cruz County. The Santa Cruz County Regional Transportation Commission (SCCRTC) and Metropolitan Transportation Commission (MTC) funding agreement provided a combined $100,000 per year to fund extra California Highway Patrol (CHP) enforcement on Highway 17 from Santa Cruz to Los Gatos between January 2003 and December 2005. The SCCRTC funds paid for extra enforcement provided by the Santa Cruz area CHP office and the MTC funds paid for extra enforcement provided by the San Jose area CHP office. With the implementation of the initial enhanced enforcement period, the highway fatal plus injury collision rate decreased from 0.64 to 0.41 collisions per million vehicle miles (36 percent). However, in the extended enhanced enforcement period, the collision rate increased from 0.41 to 0.62 collisions per million vehicle miles, which was almost back to pre-implementation rates.

Based on the history of other safety corridors, the following Eureka-Arcata Safety Corridor conclusions can be drawn. The establishment of the Eureka-Arcata Safety Corridor initially resulted in reduced collision rates consistent with other safety corridors. Like the other safety corridors, the Eureka-Arcata Corridor collision rates began to steadily increase over time. The existing condition of non-signalized, at-grade intersections on Route 101 currently remain. Thus, the potential for conflicts between drivers failing to yield to oncoming traffic while making left turn or crossing movements still exists. Without highway improvements intended to reduce or eliminate collisions related to uncontrolled left turn movements at intersections within the corridor, rates of severe collisions could continue to rise, regardless of a renewed enhanced enforcement period. Based on these findings, Alternative 7 does not meet the project need and purpose in terms of safety.

Project Purpose – Level of Service

Improving the traffic level of service (LOS) on the Route 101 roadway is one of the primary components of the project need and purpose. Roadway LOS is a measure of traffic congestion/delay and serves as a benchmark to determine whether new development would exceed the existing or preferred highway LOS. Generally the LOS is inversely proportional to the traffic volume and can be simplified as the volume to capacity ratio. In other words, if traffic volumes increase over time, the increase in traffic could eventually exceed the traffic carrying capacity and the LOS would degrade. (See Appendix B for additional LOS information.) There are six LOS letter grades described as follows:

- **LOS "A"** describes a roadway condition of free traffic flow, with low traffic volumes and high speeds.
- **LOS "B"** describes a condition of stable flow, with operating speeds beginning to be restricted somewhat by traffic conditions. Drivers still have reasonable freedom to select their speed and lane of operation.
- **LOS "C"** describes a condition of mostly stable flow, but speeds and maneuverability are more closely constricted by the higher volumes. LOS "C" is generally the minimal acceptable LOS.
- **LOS "D"** describes a condition that approaches unstable flow, with tolerable operating speeds; however, driving speed is considerably affected by changes in operating conditions.
- **LOS "E"** describes a condition that cannot be characterized by speed alone. Traffic speeds are lower than in Level D, with volume at or near the capacity of the highway.
- **LOS "F"** describes a condition in which the operating speeds are controlled by stop-and-go mechanisms, such as traffic lights. This is called forced flow operation. The stoppages disrupt the traffic flow so that the volume carried by the roadway falls below its capacity. Without the stoppages, the volume of traffic on the roadway would be higher, or in other words, it would reach capacity.

Route 101 Mainline LOS. The mainline LOS of Route 101 refers to the level of service of traffic flow on the Route 101 through lanes. In other words, mainline LOS does not reflect the congestion or delay of turning vehicles at intersections. The following section describes both the existing and projected (future) LOS on Route 101.

Existing LOS Mainline LOS. The annual average daily traffic volume for year 2013 on Route 101, in both directions between Eureka and Arcata, was about 39,000 vehicles per day and was expected to increase to about 52,000 by 2041. For year 2010, a LOS of "D" for Route 101 northbound mainline (through traffic or non-intersection travel) and a LOS of "C" for Route 101 southbound mainline were calculated between Eureka and Arcata. *(Source: Caltrans District 1 Traffic Operations Memorandum, 2011)*

Projected LOS Mainline LOS. By year 2041, Route 101 northbound 101 LOS is expected to remain at LOS "D" and Route 101 southbound is expected to remain at LOS "C" for any one of the Alternatives including the No-Build. There are currently no substantial travel delay or traffic congestion problems on Route 101 between Eureka and Arcata. *(Source: Caltrans District 1 Traffic Operations Branch Memorandum, 2012)*

Route 101 Intersection LOS

In contrast to mainline LOS, intersection LOS is a measure of the average delay experienced by each vehicle passing through an intersection. It can be measured for the vehicles making each directional turning move, using each approach leg, or as a composite average value for all vehicles using the intersection. Similar to mainline LOS, it is reported with a letter grade designation ranging from “A” to “F”. A LOS “A” represents minor delay (less than 10 seconds per vehicle); LOS “F” represents substantial waiting time, more than 50 seconds per vehicle for intersections with non-existent or inadequate signals, or more than 80 seconds per vehicle for intersections with signals. In this section, LOS is reported during peak period travel, which typically occurs in the afternoon and is denoted by PM peak in the tables that follow.

Left Turns at Non-signalized Route 101 Intersections

Non-signalized left turn movements onto and off Route 101 are currently allowed at all Route 101 intersections between Eureka and Arcata. Both years 2013 and 2041 No-Build Alternative LOS for left turn movements from local streets and driveways onto Route 101 were calculated to be “F” at all Route 101 median access locations. Table 3-4 shows only the No-Build alternative for year 2013 LOS for left turn movements from Route 101 at non-signalized intersections on Route 101. (None of the Build Alternatives would have non-signalized left turn movements.)

**Table 3-4 Level of Service (LOS)
for left turn movements off Route 101 at non-signalized intersections
using year 2013 PM peak hour traffic volumes**

	Highway Without Improvements
Airport Road	C
Mid-City Motor World	B
California Redwood Company	C
Indianola Cutoff	C
Bracut (West)	D
Bracut (East)	C
Bayside Cutoff	D

No left turns would be allowed for Alternatives 1 and 2, while Alternatives 1A, 3, and Modified Alternative 3A would allow for signal controlled left turn movements at Airport Road. For the No-Build Alternative in year 2041, the LOS for left turn movements off Route 101 are shown in Table 3-5.

Table 3-5 Projected Level of Service (LOS) for left turn movements off Route 101 at non-signalized intersections using year 2041 PM peak hour traffic volumes	
	No-Build Alternative (Route 101 without improvements)
Airport Road	D
Mid-City Motor World	C
California Redwood Company	E
Indianola Cutoff	F
Bracut (West)	F
Bracut (East)	F
Bayside Cutoff	F

Overall, for the No-Build Alternative, LOS for left turn movements to and from Route 101 for the existing highway is predicted to substantially deteriorate between 2013 and 2041.

***Right Turn Movements at Non-signalized Intersections*:** Right turn movements on and off Route 101 would be allowed at all intersections (excluding Cole Avenue for all Build Alternatives). Tables 3-6 and 3-7 summarize the LOS for right turn movements during peak pm periods for years 2013 and 2041.

Table 3-6 Level of Service (LOS)
for right turn movements to Route 101 at non-signalized intersections
using year 2013 PM peak hour traffic volumes

	Alt 1	Alt 1A	Alt 2	Alt 3	Mod 3A	No Build
Airport Road	D	N/A	D	N/A	N/A	C
Mid-City Motor World	C	C	C	C	C	B
California Redwood	C	C	D	D	D	C
Indianola Cutoff*	C	C	C/C	C/C	C/C	C
Bracut (West)	D	D	E	E	D	C
Bracut (East)	C	C	D	D	C	D
Bayside Cutoff	E	E	E	E	E	E

*Alternatives 2, 3, and 3A include an interchange at Indianola Cutoff. The interchange would include a right turn move and a merge move to enter Route 101; therefore the interchange alternatives have two LOS values.

Table 3-7 Projected Level of Service (LOS) for right turn movements onto Route 101* at non-signalized intersections using year 2041 PM peak hour traffic volumes						
	Alt 1	**Alt 1A**	**Alt. 2**	**Alt 3**	**Mod 3A**	**No Build**
Airport Road	F	N/A	F	N/A	N/A	E
Mid-City Motor World	D	D	E	E	D	C
California Redwood	E	E	F	F	F	E
Indianola Cutoff**	D	E	C/C	C/C	C/C	D
Bracut (West)	F	F	F	F	F	F
Bracut (East)	D	E	F	F	F	F
Bayside Cutoff	F	F	F	F	F	F

*Right turn move LOS values from Route 101 are not provided since they have minimal or no delay for vehicles exiting the expressway.
**Alternatives 2, 3, and 3A include an interchange at Indianola Cutoff. The interchange would include a right turn move and a merge move to enter Route 101; therefore, the interchange alternatives have two LOS values.

Overall, the LOS for right turn movements at intersections onto Route 101 is expected to degrade at most locations for all alternatives including the No-Build Alternative.

LOS at Signalized Airport Road Intersection: Alternative 3 includes constructing a fully signalized intersection at Route 101 and Airport Road. Alternative 1A includes partial signalization, which would only stop northbound Route 101 traffic to allow left turns for southbound Route 101 traffic. Modified Alternative 3A includes a half signal at Route 101 and Airport Road that would allow left turn movements to and from Route 101. Table 3-8 shows the existing and projected turn movements for the three alternatives that include signalization at the Route 101/Airport Road intersection:

Table 3-8 Turn Movement Level of Service (LOS) at Airport Road for Alternatives 1A, 2, and Modified 3A for the years 2013 and 2041 PM Peak Period			
	Westbound left onto Route 101	**Southbound left off Route 101**	**Westbound right onto Route 101**
Year 2013			
Alternative 1A	N/A	A	A
Alternative 3	F	C	C
Modified Alternative 3A	C	A	A

Table 3-8 Turn Movement Level of Service (LOS) at Airport Road for Alternatives 1A, 2, and Modified 3A for the years 2013 and 2041 PM Peak Period			
	Westbound left onto Route 101	Southbound left off Route 101	Westbound right onto Route 101
Year 2041			
Alternative 1A	N/A	B	A
Alternative 3	F	F	F
Modified Alternative 3A	D	B	A

Overall, the turn movements at Airport Road for the project Build Alternatives with signals are acceptable, except for Alternative 3. Without building costly additional lanes, LOS "F" would be unavoidable. Note that the existing left turn onto Route 101 from Airport Road is currently LOS "F".

In terms of acceptable LOS, the half signal at Airport Road would work satisfactorily (at least LOS "E"); however, between 15 and 20 years after construction of the signal, the projected increased volume of traffic on Route 101 would require that the phase for the westbound left turn movement onto southbound Route 101 be abandoned or discontinued. In 15 to 20 years, this would result in the southbound left turn from Route 101 being the only allowed left turn movement. *(Source: Caltrans Summary of Operational Analysis for Alternative 3B, Half Signal at Airport Road, 2010)*

The LOS at 4th and 5th Streets (Route 101) at V Street in Eureka was evaluated for all Build Alternatives for year 2013. The calculated LOS for the Alternatives for 4th and V Streets and 5th and V Streets was LOS "A" and LOS "B". In year 2041, the LOS at 4th and V Streets and 5th and V Streets is projected to change to LOS "B" and LOS "C".

The Route 101/255 interchange in Arcata includes multiple on- and off-ramps. At all ramps, the LOS was anticipated to be LOS "A" for all Alternatives for year 2013. In year 2041, the LOS would remain the same as year 2013 except for the westbound off-ramp and eastbound on-ramp transition, which would drop to LOS "B".

Project Effects on Local Roads and Intersections

Segment Collisions On Local Roads. Segment collisions (injury and fatal) are defined as collisions that occur outside the defined area of an intersection. Statewide average collision rates for segments are calculated in terms of collisions per million vehicle miles (as compared to intersection collisions which are in terms of collisions per million vehicles). Hence, long segments of roads are more sensitive to changes in traffic volume than intersection collisions. For year 2013 and the design year 2041, Alternative 1 could result in a 60 percent increase in traffic on Old Arcata Road south of Indianola Cutoff; the predicted increase of traffic volume on Old Arcata Road for Alternative 1 could potentially increase the number of segment collisions. For year 2013 and the design year 2041, Alternatives 2, 3, and Modified Alternative 3A were not expected to increase segment collisions on Route 255 and Old Arcata Road because these alternatives would not divert traffic to these two roads.

Intersection Collisions. Intersection collisions (injury and fatal) are defined as collisions that occur within a specific area of an intersection. Intersection collisions on Route 101 outside the Eureka-Arcata Corridor limits, Route 255, and Old Arcata Road were not expected to change for any one of the Build Alternatives for both year 2013 and year 2041 since the project would not change any of the local road intersections in terms of configuration.

Even though the No-Build Alternative does not include any proposed roadway changes, traffic volumes and speeds are expected to increase in the foreseeable future, which may necessitate closing one or more Route 101 intersection median openings within the corridor. Closing one or more intersection median openings could potentially restrict access to businesses and residences and result in diverting additional traffic to local roads. Consequently, the No-Build Alternative could potentially have effects to local roads that are similar to Alternative 1.

Project Effects on Local Road Volumes. The percent change in traffic volumes for each Alternative for both year 2013 and year 2041 was calculated using an average volume weighted by the distance of each segment for Routes 101, Route 255, and Old Arcata Road (Table 3-10).

Old Arcata Road is a two-lane county road that extends from Eureka to Arcata and is approximately ten miles long. There are many access points along Old Arcata Road; public or private roads/driveways connect to Old Arcata Road, but most of the access is from driveways with housing immediately adjacent to the roadway. Old Arcata Road passes through the community of Bayside, which has a K through 8^{th} grade public school, post office, and other businesses that are accessed immediately from Old Arcata Road (see Figure 3-6). Old Arcata Road was improved in 2009. Between Jacoby Creek Road and the Route 101/255 interchange in Arcata, there are traffic circles and speed bumps to slow traffic—potentially discouraging using this road as a Route 101 detour. The most recent available average daily traffic volume on Old Arcata Road was 7,600 vehicles.

If Alternative 1 were constructed, traffic volume is expected to increase by approximately 60 percent on Old Arcata Road between Eureka and Indianola Cutoff for both year 2013 and year 2041; this would be a substantial increase compared to the existing condition. Currently left turns to and from Route 101 are allowed; however, Alternative 1 would remove all left turn movements without a grade separation or signalization. Alternative 1 would thus divert a high proportion of traffic from Route 101 to Indianola Cutoff and Old Arcata Road. See Table 3-9.

Figure 3-6 Photograph of Old Arcata Road between Indianola Cutoff and Arcata, Facing North

Table 3-9 Projected increase in traffic volumes of weighted average by distance for all Build Alternatives as compared to the pre-Safety Corridor* (posted speed limit 60 mph) condition within the Eureka-Arcata Corridor for years 2013 and year 2041					
	Alternative				
	1	**1A**	**2**	**3**	**Modified 3A**
Route 101	7%	0%	6%	1%	1%
Route 255	0%	15%	6%	1%	1%
Old Arcata Road	60%	10%	7%	-2%	-2%

*Immediately after the establishment of the Safety Corridor in 2002, a 30 percent increase occurred as a result of a portion of drivers diverting to State Route 255 to avoid the Route 101 Safety Corridor. Over the years, the traffic diversion from Route 101 to State Route 255 basically returned to pre-Safety Corridor conditions.

Traffic LOS at Local Road Intersections

Old Arcata Road. The LOS was also calculated at four intersections along Old Arcata Road (OAR) between Eureka and Arcata (Freshwater Road, Indianola Cutoff, Bayside Cutoff and Jacoby Creek Road) to assess potential effects to traffic patterns of the proposed project Alternatives on Old Arcata Road.

The predicted left turn movements to and from Old Arcata Road (OAR) at Bayside Cutoff during the AM and PM Peak Hour would be LOS "C" or better for all Alternatives.

Tables 3-10 and 3-11 show year 2013 and year 2041 left turn movements onto Old Arcata Road (OAR) from Freshwater Road during the AM and PM Peak Hour.[12] Delays currently occur during peak periods for left turn movements from Freshwater Road onto Old Arcata Road.

Table 3-10 Level of Service at Freshwater Road and Old Arcata Road for Year 2013 traffic volumes, during AM/PM Peak Hour

Alternatives	Left onto OAR	Right onto OAR	Left off OAR
1, 1A, 2, 3, Modified 3A, 7	E/E	A/A	A/A

Table 3-11 Level of Service at Freshwater Road and Old Arcata Road for Year 2041 traffic volumes, during AM/PM Peak Hour

Alternatives	Left onto OAR	Right onto OAR	Left off OAR
1, 1A, 2, 3, Modified 3A, 7	F/F	B/B	A/A

Tables 3-12 and 3-13 show the intersection LOS at Old Arcata Road and Jacoby Creek Road for years 2013 and 2041 for the Alternatives.

[12] A County of Humboldt project to construct a roundabout at the Freshwater and Old Arcata Road (Myrtle Avenue) Intersection is identified in the 2008 Regional Transportation Plan (RTP). A roundabout would be expected to substantially improve LOS at this location.

Table 3-12 Level of Service at Jacoby Creek Road and Old Arcata Road for year 2013 volumes, during AM/PM Peak Hour			
Alternative	**Left onto OAR**	**Right onto OAR**	**Left off OAR**
1	B/B	A/B	A/A
1A	B/B	A/B	A/A
2	B/B	A/B	A/A
3	B/B	A/B	A/A
Modified 3A	B/B	A/B	A/A
Alternative 7 – Existing Condition without Improvements	B/B	A/B	A/A

Table 3-13 shows the predicted LOS for turn movements at Old Arcata Road and Jacoby Creek Road. Traffic modeling indicates that none of the Build Alternatives would have an adverse effect to the LOS at Jacoby Creek Road and Old Arcata Road for left turn movements onto Old Arcata Road during the PM Peak Hour. All other turn movements during both AM and PM peak hours are at, or better than LOS “C”, except for Alternative 1 which is LOS “D” for right turns from Jacoby Creek Road onto Old Arcata Road.

Table 3-13 Level of Service at Jacoby Creek Road and Old Arcata Road for year 2041 volumes, during AM/PM Peak Hour			
Alternative*	**Left onto OAR**	**Right onto OAR**	**Left off OAR**
1	C/F	B/D	A/B
2	C/F	B/C	A/B
3	C/F	B/C	A/B
Alternative 7 - Existing Condition without Improvements	C/F	B/C	A/B

*Traffic LOS predictions at this intersection were not made for Alternative 1A and Modified Alternative 3A but they would be no worse than Alternatives 1, 2, or 3.

Indianola Cutoff links Route 101 to the west with Old Arcata Road to the east. A roundabout currently exists at the intersection of Indianola Cutoff and Old Arcata Road. All Alternatives would perform LOS “A” for 2013 at the Indianola roundabout. None of the Build Alternatives would adversely affect the LOS of this roundabout for both existing and future conditions. The roundabout performs at LOS “A” currently, and under Alternative 1 was expected to perform LOS “A” in 2013 and LOS “C” for 2041. Alternative 1 is considered to have the highest impact to Old Arcata Road and this is considered to be the worst case scenario; all other Alternatives would perform LOS “C” or better in 2041.

In summary, except for Alternative 1, although LOS depends at some locations on certain turn movements, none of the Build Alternatives would adversely affect the intersections on Old Arcata Road between Eureka and Arcata. In other words, the LOS is predicted to degrade at certain locations and for certain turn movements because of the predicted increase in traffic—not as a result of the project (except for Alternative 1).

Impacts on LOS at 4th and 5th Streets at V Street in Eureka (southbound and northbound Route 101, respectively) were evaluated for all Build Alternatives for the year 2041. The calculated LOS for all Alternatives for 4th and V Streets and 5th and V Streets are “B” and “C”, respectively.

Project effects on LOS for four different weave movements at the existing Route 101/255 interchange in Arcata (on- and off-ramps) for the year 2041 were evaluated for Alternatives 1, 2 and 3. For all three Alternatives, the LOS for the four traffic weave movements are “A” (northbound and southbound) and “B” (westbound and eastbound).

State Route 255. The LOS was also calculated at five intersections along State Route 255 (which included Peninsula Drive, Pacific Road, and Lupin/Victor Road [in Manila]) to assess impacts as a result of changes in traffic patterns due to the proposed Alternatives on Route 101. For all Build Alternatives, LOS “B” or better was calculated for each turning movement for year 2013 traffic volumes. The annual average daily traffic volume on State Route 255 in 2012 was 7,600 vehicles.

Project effects on LOS were calculated at State Route 255 intersections with Pacific Road and Lupin Drive (in Manila) for year 2041. For all Build Alternatives, LOS “C” or better is predicted at these intersections.

Overall, none of the project Build Alternatives would affect State Route 255 for the years 2013 or 2041.

Project Alternatives - Potential Effects on Transportation Modes

Railroad

None of the Build Alternatives would cross or require acquisition of temporary or permanent railroad easement from the North Coast Railroad Authority (NCRA): consequently, the proposed project would not temporarily or permanently impact the potential future operation of the railroad.

Public Transit

None of the Build Alternatives would temporarily or permanently impact public transit (bus) operations. There are no bus stops on Route 101 between the Eureka Slough bridge and the Route 101/255 interchange in Arcata. The feasibility of adding a bus stop on Route 101 at

Indianola Cutoff, however, would be greatly enhanced by a Route 101/Indianola Cutoff grade separation, which is included in Alternatives 2, 3, and Modified Alternative 3A.

Murray Field Airport (Humboldt County Airport)

None of the project Alternatives would affect the existing flight operations at the Murray Field Airport. For Alternative 3, the proposed additional lane would be realigned into the Route 101 roadway median to avoid a conflict with airport flight paths. Alternative 3 would likely require an encroachment permit for construction in the southwest corner of Murray Field for the realignment of Airport Road intersection with Route 101. The proposed construction work would not require taking any existing buildings within the airport complex. However, according to a September 18, 2007 letter from the Humboldt County Department of Public Works – Aviation Division, the portion of the airport needed for the intersection alignment is earmarked for airport development; consequently, the County recommended realigning the intersection outside of airport property.

Bicycle and Pedestrian Travel

As a result of the California Coastal Commission Coastal Consistency Certification process, Caltrans is committed to ensure adequate commitments are in place for a separate Class 1 bike and pedestrian trail parallel to Route 101 from Arcata to X Street in Eureka. Except for Alternative 1A, the proposed roadway project would not affect the Bay bicycle trail during or after construction. Modified Alternative 3A includes a proposed grade separation (interchange) at Indianola Cutoff, which would provide west-east connectivity (i.e., protected access across Route 101) between the bicycle trail and origins/destinations on the east side of Route 101.

While any one of the Build Alternatives would restrict or eliminate left turn movements along the Eureka-Arcata Route 101 Corridor, none of the project Alternatives propose to reduce or eliminate the number of right turn on and off movements at the Route 101 intersections (except at Cole Avenue where the right turn move onto northbound Route 101 would be eliminated). With the elimination of left turn and crossing movements, bicycle safety would be substantially enhanced for bicyclists on Route 101. In addition, all Build Alternatives include extending the existing acceleration and deceleration lanes at the Route 101 intersections, which is expected to enhance bicycle safety by providing a longer transition distance for vehicle maneuvering. Bicycle safety would also be enhanced by a barrier-separated travel way for non-motorized traffic on the proposed new southbound Jacoby Creek bridge.

After project construction, the posted speed limit of 50 mph between the Eureka Slough bridges and Gannon Slough bridges would remain at the existing posted 50 mph speed limit. However, 45 days after project construction, Caltrans would conduct an Engineering and Traffic Survey to comply with the California Vehicle Code. The California Vehicle Code requires a renewed engineering and traffic survey whenever substantial changes in roadway or traffic conditions have occurred. If the prevailing 85th percentile of traffic eventually rises above 55 mph after project construction, Caltrans would be required to address the condition: raising the posted speed limit would be considered and possibly implemented.

For bicyclists commuting to and from Eureka and Arcata, none of the project Alternatives would increase travel distances or times. For bicyclists whose destination may be one of the businesses, the mobile home park, campground or other median access points along the Route 101 corridor, travel distance could be increased by as much as ten miles under Alternative 1 (refer to Table 3-3); there would be no opportunities to cross or turnaround on Route 101 between the Eureka Slough bridge and the Route 101/255 interchange in Arcata.

Alternative 1A includes three turnarounds (U-turns) that would result in a wider roadway at the U-turn locations and would thereby reduce the opportunity to construct a new bicycle trail on either or both sides of Route 101. In addition, it is anticipated most bicyclists would choose not to use the U-turns, which would require bicyclists to merge across two traffic lanes and then share the U-turn lanes with fast moving vehicle traffic. If bicyclists chose not to use the U-turn lanes, the only other Route 101 crossing/turning option would be at the partially signalized Route 101/Airport Road intersection.

Alternative 2 would minimize out-of-direction travel by providing a turnaround opportunity at the proposed Route 101/Indianola Cutoff grade separation approximately midway between Eureka and Arcata. Alternative 3 would include a full signal at Airport Road and Route 101, in addition to a grade separation at Route 101 and Indianola Cutoff. Modified Alternative 3A includes a half signal at Route 101 and Airport Road, which would allow bicyclists to turn left to and from Route 101 and Airport Road. Alternative 1A includes partial signalization at Airport Road similar to Modified Alternative 3A—except that left turn movements would not be allowed from Airport Road to southbound Route 101.

For pedestrians, the effects of the Build Alternatives would be similar to the potential effects of bicyclists. However, the pedestrian access between businesses and residences on Jacobs Avenue would not change, regardless of the Alternative.

Alternative 7, the No-Build Alternative, does not include any proposed roadway changes, thus would not have any direct impact on bicyclists or pedestrians. However, if no safety improvements are made, traffic volumes and speeds are expected to steadily increase resulting in higher collision rates; this may necessitate closing one or more Route 101 intersection median openings within the corridor. Closing one or more intersection median openings could potentially restrict access to businesses and residences and add out-of-direction travel and delay that would be similar to Alternative 1. Finally, the No-Build Alternative could delay construction of the Humboldt Bay Trail since the California Coastal Commission conditioned their Coastal Development Permit approval of the Route 101 project on prior or concurrent construction of the Humboldt Bay Trail. (See Chapter 3, Section 3.1.1 Land Use, Community, and Businesses.)

Summary of Project Environmental Consequences

The number of injury and fatal collisions at intersections within the project limits is expected to steadily increase over time with Alternative 7, the No-Build Alternative, as the volume of traffic increases on Route 101. At most Route 101 intersections, Alternative 7 (No-Build) would result in substantial continued degradation of LOS for left turn movements at intersections for PM peak hour traffic volumes. Construction of any one of the Build Alternatives would substantially improve safety immediately and for the long term.

For both year 2013 (latest data) and year 2041, out-of-direction travel distance for local trips to businesses and residents would increase for any one of the Build Alternatives with Alternative 1 having the greatest distance added. However, any one of the Build Alternatives would eliminate uncontrolled left turn movements, thus improve both short term and long term intersection level of service at Route 101 intersections between Eureka and Arcata. Through traffic on Route 101 (drivers not making stops within the Eureka-Arcata Corridor) would not generally be affected by any of the project Alternatives (including the No-Build).It should be noted that the proposed project would not add additional through lanes that would increase the traffic carrying capacity of Route 101. With or without the project, traffic volumes are expected to increase on Route 101 and the local roads because of anticipated population and development growth. On Old Arcata Road, increase in traffic volume is expected to degrade intersection level of service (without the project).

Refer to Chapter 3, Section 3.1.4 – Community Impacts for information on how this project could affect traffic patterns for residents and businesses.

Traffic During Project Construction

Construction activities include building the Indianola Cutoff grade separation (except Alternatives 1 and 1A), replacing the southbound Jacoby Creek bridge, and various roadway improvements such as removing fixed objects within the clear recovery zone. Construction activities would cause limited temporary disruption of local access to homes and businesses along the Route 101 corridor. Construction is expected to be completed in three years.

Bicyclists and Pedestrians During Construction

During construction of any of the Build Alternatives, bicyclists would be affected by temporary lane closures or other roadway use restrictions and the presence of construction workers, vehicles and materials. Any one of the Build Alternatives would have some temporary construction-related interruptions of pedestrian and bicycle travel or access.

AVOIDANCE, MINIMIZATION, AND/OR MITIGATION MEASURES

As discussed in the Environmental Consequences section, closing the Route 101 medians would have varying adverse effects depending on which Alternative was constructed. In general, closing the medians and eliminating uncontrolled left turn movements would result in out-of-direction travel.

Intersection level of service (LOS). All Alternatives, including the No-Build Alternative, would result in LOS "D" or lower for both the existing and projected conditions at certain intersections and for certain turn movements. Avoidance, minimization, or mitigation to improve the LOS for all turn movements at all intersections would not be possible without a substantial increase in cost and impact. However, any one of the Build Alternatives would greatly improve safety compared to the No-Build Alternative.

Traffic access and out-of-direction travel. Construction of a grade separation at Route 101 and Indianola Cutoff (Alternatives 2, 3, and Modified Alternative 3A) would substantially improve out-of-direction travel for local residents and businesses along Jacobs Avenue and in Bracut. The annual vehicle hours of increased delay to local residents and businesses is reduced more than 50 percent with the construction of Alternative 2 and the annual cost associated with that delay is less than 30 percent of that associated with Alternative 1. In addition, a grade separation at Indianola Cutoff would prevent substantial traffic diversion to Old Arcata Road that would be expected to occur if Alternative 1 were constructed. Old Arcata Road is less suited to accommodate higher traffic volumes and speeds than Route 101. Alternative 3 includes construction of a fully signalized intersection at Route 101 and Airport Road, which would further minimize out-of-direction travel for businesses and residents on Jacobs Avenue if the Route 101 median openings were closed. Modified Alternative 3A, the third alternative with a grade separation, includes a half signal for traffic accessing the businesses and residents at Jacobs Avenue.

Measures to avoid and minimize traffic delay during Construction

Bridge Construction Work Sequence and Traffic Detouring

The new bridge would be erected to the east of the existing southbound Jacoby Creek bridge. The southbound Jacoby Creek bridge replacement would require both lanes to be open during peak travel periods (basically daylight hours); therefore, the bridge would need to be replaced in a manner where two lanes could be made available every day. The method proposed for the bridge replacement would involve constructing the new two lane bridge temporarily next to the existing bridge, realign traffic to the new bridge, remove the old bridge, then choose one evening to close the southbound lanes altogether to move the new bridge to the original alignment, and finally relocate traffic back to its original alignment.

A comprehensive transportation management plan (TMP) would be prepared prior to construction to maintain circulation on streets and arterials for the duration of the three year construction period. Caltrans staff would coordinate preparation of the TMP with the

California Highway Patrol, emergency services, and public agencies such as the County of Humboldt. The TMP would also consider community and special events and holidays. The TMP would be implemented during construction and would minimize disruption to travelers, business owners, customers and residents. The TMP would require, but not be limited to, standard measures such as:

- Limiting long-term lane closures; during peak travel periods, two lanes of traffic in each direction on Route 101 would be maintained. If lane and ramp closures were necessary, they would be limited to night and off-peak hours;
- Placing work hour restrictions on both the Route 101 mainline and business accesses;
- Local streets and private driveways would be kept open during the construction of any one of the Build Alternatives;
- Advanced changeable message signs and broadcast media notifications, detour plans, and other contingency plans;
- Prohibiting any road work on holidays (such as the 4th of July or Labor Day weekend) or when special events are scheduled;
- Caltrans would provide advance notification of planned highway detours and road closures to local cities and the County of Humboldt;
- Caltrans would inform businesses and the media in advance of any project work that might affect business;
- Bicycle access would be maintained through the project construction zone. There is no expectation for detours for bicycles. Project construction contract special provisions would require the construction contractor to be responsible to maintain a clean shoulder that is safely passable by bicyclists;
- The existing posted speed limits on Route 101 between Eureka and Arcata would remain the same during construction to avoid excessive traffic delays and traffic diversion to State Route 255 or Old Arcata Road.

Implementation of such measures would minimize construction impacts on any particular location along the Route 101 corridor. Since the overall traffic flow is expected to be maintained during project construction, diversion of traffic to State Route 255 and Old Arcata Road is not anticipated.

Alternative 7, the No-Build Alternative, would not cause any temporary impacts on access to local businesses or residential areas. However, if the project was not constructed and if safety and operations further degraded, the eventual closing of medians could occur under the No-Build Alternative and would be similar to the traffic conditions under Alternative 1.

3.1.7 Visual / Aesthetics

This section is summarized from a report entitled Visual Impact Assessment – Eureka to Arcata Route 101 Corridor Improvement Project finalized in November 2006, a report entitled Visual Impact Assessment – Eureka-Arcata Corridor Combined Roadway Rehabilitation and Transportation Project, prepared in October 2006, and a memorandum about any changes to the landscape corridor and Modified Alternative 3A prepared in 2015.

REGULATORY SETTING

The National Environmental Policy Act of 1969 (NEPA), as amended, establishes that the federal government uses all practicable means to ensure all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings [42 U.S.C. 4331(b)(2)]. To further emphasize this point, the Federal Highway Administration, in its implementation of NEPA [23 U.S.C. 109(h)], directs that final decisions regarding projects are to be made in the best overall public interest taking into account adverse environmental impacts, including, among others, the destruction or disruption of aesthetic values.

Likewise, the California Environmental Quality Act (CEQA) establishes that it is the policy of the state to take all action necessary to provide the people of the state "with…enjoyment of aesthetic, natural, scenic and historic environmental qualities California Public Resources Code Section 21001(b)" *(Source: Official California Legislative Information, 2015)*

The California Coastal Act includes Section 30251 Scenic and visual qualities:

> "*The scenic and visual qualities of coastal areas shall be considered and protected as a resource of public importance. Permitted development shall be sited and designed to protect views to and along the ocean and scenic coastal areas, to minimize the alteration of natural land forms, to be visually compatible with the character of surrounding areas, and, where feasible, to restore and enhance visual quality in visually degraded areas.*"

Section 3.40(B)(3) Humboldt Bay Area Plan of the Humboldt County Local Coastal Program (date of printing December 2014) emphasizes the importance of public coastal views from Route 101:

> *"In the Coastal Scenic Area designated in the Humboldt Bay Area Plan Map (Indianola area), it is the intent of these regulations that "all developments visible from Highway 101 be subordinate to the character of the designated area."*

AFFECTED ENVIRONMENT

Moderate to high levels of visual quality exist along Route 101 between Eureka and Arcata, determined through an evaluation of the area's natural and developed features. Within the project limits, the highway corridor has a mostly pleasant appearance from natural characteristics of the landscape such as Humboldt Bay to the west of the highway and picturesque hills to the east which tend to dominate most views. The scenic appeal of these features is diminished in places by the visual presence and character of development where it exists along and near the highway. Such development includes industrial and commercial development, major overhead utilities, and numerous billboards. Trees and shrubs along the highway sometimes play an important role in screening or buffering views from the highway of roadside development, which detract from the rural character.
In other places, however, such development is within full view from the highway. Route 101 in Humboldt County is eligible for designation, but has not been officially designated, a State Scenic Highway.

The existing row of Blue gum Eucalyptus (*Eucalyptus globulus*) trees along the west side of Route 101 was planted in approximately 1926. During an extreme frigid period, most of the trees froze and suffered severe damage and were cut down in 1933. The trees standing today sprouted from the original stand. The lumber mill to the west was opened in 1953. At that time, some trees were removed to provide vehicular access to the mill. The eucalyptus trees have been around since many people's childhood. Many long-term local residents consider this visually prominent row of trees an important landmark. Non-residents have also commented on the memorability of the row of eucalyptus trees. In the course of three public meetings which were held, many people expressed their concern regarding potential eucalyptus tree removal on the west side of Route 101 for all Build Alternatives. However, other local residents perceive eucalyptus trees as invasive, non-native trees.

After circulation of the Draft EIR/EIS, there was substantial negative public response to removal of the eucalyptus trees along the corridor. Design changes were made, and the lanes were shifted south and east to avoid removal of these trees.

Through analysis of specific viewpoints and examination of the visual experience of moving through the view corridors of the proposed project, it was found that the existing high visual quality is mostly due to the following:

- Views of Humboldt Bay.
- Views of the rural character of the area; pasturelands, sloughs, and forested hillsides.
- Tree and shrub vegetation providing space-defining qualities and screening of negative views.
- The distinctive landmark characteristics of the eucalyptus tree row. The height, length, volume, screening properties of negative views of the lumber mill, afternoon sun and shade patterns, and spatial definition.

- Public perception of trees and other vegetation along the corridor.
- Wildlife, such as egrets, in wetland areas adjacent to the highway.

The various viewer groups within the Eureka-Arcata Corridor are motorists, passengers, bicyclists and pedestrians. These groups are moving at different speeds, thus the viewer experience differs. Motorists have a quick experience of the various views. Bicyclists and pedestrians would have longer experiences of the views, therefore might be more sensitive to changes in the views. Viewer groups enjoy the landscape views of the bay, pastures, marsh and forested mountains. Overall, it can be expected that slower moving viewers are more sensitive to negative impacts to the views.

Existing views from Route 101

Northbound Eureka to Arcata along Arcata Bay

The highway between Eureka and Arcata is separated by a wide vegetated median. The median ranges from 47 feet wide between the Eureka Slough bridge and Airport Road, to 80 feet wide for the majority of the corridor. The median consists of grasses with wetlands in the wider or deeper portions. Approaching the State Route 255 overcrossing (Samoa Boulevard), the median narrows to 22 feet wide, increasing to 54 feet wide at the 11th Street overcrossing, which is the north end of the project limit.

Motorists traveling northbound have initial views of light commercial/industrial businesses to the east. Views of the businesses are partially screened by Monterey Cypress (*Cupressus macrocarpa*) trees. The views of the commercial area are of short duration.

Views north and to the east beyond the commercial properties are of rural grasslands and forested hillsides. Views are open to the west and the traveler has a panoramic view of Arcata Bay. The visual quality looking north and west is high quality. The visual quality looking east is moderate.

As the traveler passes Airport Road, located 0.9 mile north of the Eureka Slough bridge, the foreground views to the east are of a narrow water channel, pastureland, an airport, and forested hillsides beyond. (See Figure 3-7). The road curves to the left slightly and the traveler starts to notice the buildings to the right housed by Mid-City Motor World, a car dealership. On the western side of the highway, a long line of tall eucalyptus trees visually defines the highway as a corridor. Other tall trees on the east side of the highway accentuate the feeling of a corridor. By the time the traveler reaches the eucalyptus tree row, views of Humboldt Bay (Arcata Bay) are obstructed by the mill. The eucalyptus trees line the highway and are in a narrow space between the highway and a railroad. The eucalyptus tree row partially screens the mill.

Figure 3-7 View of northbound Route 101 from Airport Road

To the east and parallel to Route 101 roadway, a watercourse functions as a tidal slough. This water channel is prominent and continues northwards to Gannon Slough bridge. Egrets are a common sight among the cattails and water. Mowed grass and native shrubs grow between the highway and the water channel, providing a natural vegetated area. Mid-City Motor World, a car dealership, is adjacent to the water channel, with new cars parked near the top of the eastern bank. The dealership is prominent with its buildings, numerous cars, and a merry-go-round. In this section, the few Monterey pines (*Pinus radiata*) and Bluegum Eucalyptus trees on the eastern side of the highway accentuate the feeling of a corridor.

As the traveler continues past the entrance of Mid-City Motor World, the entrance to California Redwood Company is on the left. There is a break in the line of eucalyptus trees for the entrance road to the lumber mill facility. The mill has the majority of its facilities to the south of this entrance. On the north side of the entrance, there is one dark brown office building. Just beyond the office building, Humboldt Bay curves back close to the railroad and highway. Views of the bay open up through the line of eucalyptus trees. The row of eucalyptus trees along the north side of the lumber mill was thinned out in the mid 1990's. This provided more open views of the bay while still continuing to create a sense of the corridor. The eucalyptus trees extend in a single row along the highway for 1.25 miles. The eucalyptus trees are a dominant feature in the landscape due to their height of approximately 80 feet and the row's length.

At the end of the eucalyptus tree row, views of Humboldt Bay from Route 101 open up completely. See Figure 3-8. Monterey pine and cypress trees on the east side of the highway partially block views of pastureland with forested hills beyond.

Figure 3-8 View of Humboldt Bay from Northbound Route 101 Between California Redwood Company and Indianola Cutoff

The intersection at Indianola Cutoff has some commercial buildings on the southeast side. These are partially screened by large Monterey Pines and Monterey Cypress trees. The commercial buildings are set back off the highway. The large wooden backdrop to a former drive-in movie theater is visually prominent. Currently, it is a recreational vehicle sale lot—this feature detracts from the pastoral landscape.

At 0.7 mile north of Indianola Cutoff, the Route 101/Bracut intersection provides access to several commercial businesses on both sides of the highway. There are two to three businesses on each side of the highway, which detract minimally from the natural landscape. Cypress and pine trees partially screen the low visual quality of the firewood business on the east. The Caltrans Maintenance Station is on the right. The highway curves again slightly to the left. Here the view opens up to pastureland on the east seen through Monterey pines and wax myrtle and the bay on the west.

Bayside Cutoff is the intersection 0.5 mile to the north of Bracut. North of Bayside Cutoff, several Monterey pines grow in the median and the east side of the highway at Jacoby Creek. Further north on Route 101, the Monterey pines provide a vertical element and frame the views.

North of Bayside Cutoff, the highway makes a transition from a conventional highway to a freeway facility. Beginning north of Gannon Slough bridge, metal beam guardrail is in the median. The median continues to be 80 feet wide narrowing to 2 feet wide near the southbound South G Street onramp. The posted speed limit increases in this section from 50 to 65 miles per hour. There are views of pastureland to the east, with views of houses on the hills of Arcata to the north.

North of the Bayside Cutoff intersection, all three Build Alternatives include widening to the northbound Jacoby Creek and Gannon Slough bridges. The traveler often is unaware of passing over these two short bridges, as they are very short and have low railings. Gannon Slough is visible north of the bridge where it flows parallel to the freeway.

The traveler notices a change in the landscape as they approach the southern end of Arcata near the Route 101/255 interchange. The visually dominant overhead crossing of Route 255 over the freeway alerts the traveler that they are now in a more urban setting. This begins the second visual section of the project.

The northern section of the project is an urban environment. Freeway on and off- ramps become closer together. The freeway is set lower than the city streets, with four streets and one pedestrian overcrossing overhead. The slopes of the freeway are attractively landscaped with grass and conifer trees.

The median begins to widen north of the State Route 255 (Samoa Boulevard) interchange. The median is landscaped with grass and shrubs. The existing median barrier that started north of Gannon Slough ends at the 14th Street off-ramp.

Existing Views from the Road - Southbound Arcata to Eureka along Arcata Bay

The freeway through Arcata is below street level. As the southbound highway approaches State Route 255 (Samoa Boulevard), the freeway and city streets are at the same level. South of the Route 101/255 interchange, the views open up to a flat rural landscape to the west. A narrow median with a metal beam guardrail does not minimize the eye level views of pastureland to the east. The top of the barrier is below the driver’s eye level. Forested hillsides provide a backdrop with strong character. Shortly thereafter, just south of the South G Street onramp, views of Humboldt Bay open up and the shoreline of the bay becomes an important feature.

The railroad, which is close to the highway becomes visible and adds to the linear character of the highway and edge of bay. The Humboldt Bay National Wildlife Refuge is adjacent to the railroad bed. In the background, the traveler can see the row of tall eucalyptus trees and lumber mill buildings, with the Eureka skyline beyond. See Figure 3-9.

Figure 3-9 View Humboldt Bay and Eucalyptus Tree Row from Southbound Route 101, near Jacoby Creek

The first vertical elements in the foreground landscape are pine trees in the median at Gannon Slough bridge and Jacoby Creek bridge. Surrounding views remain open.

Southward of Bayside Cutoff, the highway curves to the right. As the traveler approaches the Bracut intersection, the land juts out into the bay. Shrubs on the bay side are mostly native. To the east, the topography and cypress trees screen the firewood business. The Caltrans Maintenance Station is visible on the left, across the northbound lanes. Pacific Wax Myrtle shrubs were planted in 2014 to screen the fence and minimize views of the buildings. A manufactured home business and the Bracut Lumber Yard come into view on the west. The visual quality in this section is moderate.

South of the Bracut Lumber Yard, the bay is closer to the highway and the visual quality of the views are high. The Humboldt Bay bridges crossing from Eureka to Samoa come into view in the background. In the middle ground, the edge of the bay is lined with a long row of tall eucalyptus trees, which become a dominant element in the landscape as the trees come into the foreground. Several large billboards between the highway and Humboldt Bay lower the visual quality of the bay views. Several groupings of eucalyptus, Monterey Cypress, and Monterey Pine trees on the eastern side enhance the spatial quality of the corridor.

The eucalyptus trees at the north end are spaced such that views of the bay continue to be visible through the trees. Glimpses of sky can be seen through the trees. See Figure 3-10. Views of the bay through the trees run approximately 0.4-mile. The trees in this location substantially block middle ground views of the lumber mill. After 0.4-mile, buildings at the lumber mill behind the trees come into view.

Figure 3-10 View Facing South of the North End of Eucalyptus Tree Row, South of Indianola Cutoff

There is a break in the eucalyptus trees at the California Redwood Company entrance. Several large building structures come in view for a short duration. The eucalyptus trees in the section south of the California Redwood Company entrance are closer together than those in the northern section, screening views of the multitude of structures and appurtenances of the lumberyard.

Even though there is a break in the eucalyptus trees at the mill entrance, from the ground the row of eucalyptus trees appear continuous. The break in the trees is more noticeable when viewed from the distance or from the air.

The highway shoulder in the section of the eucalyptus trees is 10 feet wide. The vertical element of the tall trunks of the eucalyptus trees are in close proximity to the guardrail. The height of the eucalyptus trees, in addition to the length of the row, produces the effect of a dominant living wall feature which is highly memorable. Glimpses of sunlight, sky, and building structures can be seen behind the trees.

To the east, the traveler sees the cars, merry-go-round, and buildings of Mid-City Motor World car dealership. The quality of views of the pastoral landscape surrounding the car dealership and of the forested hills in the background is high, providing moderate to high visual quality in this area.

Views of Humboldt Bay open up at the south end of the eucalyptus tree row; however, views of the bay are partially blocked by wax myrtle shrubs and shore pines. To the east, views open up of the Murray Field Airport and Jacobs Avenue. Jacobs Avenue is lower than the highway and, coupled with the Monterey Cypress trees at the top of the slope, the commercial businesses on Jacobs Avenue are only partially visible. The roadway curves to the right, with views of the city of Eureka in the background. The wide grassy median adds to the visual quality of the area. Billboards between the highway and the bay reduce the visual quality. The visual quality of southbound views looking west and east is moderate.

Scenic Resource Determination

As part of the field inventory of the existing visual setting, features of the landscape that might qualify as scenic resources were evaluated according to procedures outlined in the Caltrans Standard Environmental Reference. Such features may include, among other things, trees that represent unique specimens or those that exhibit outstanding visual characteristics due to their age, size, arrangement, or visual impression as a group. This project was reviewed for scenic resources. The scenic resources in this area are Humboldt Bay and the eucalyptus tree skyline.

ENVIRONMENTAL CONSEQUENCES

Study Methods

The methods used to assess the visual impacts of the project are in accordance with Federal Highway Administration (FHWA) guidelines as described in the Visual Impact Assessment for Highway Projects published in 1981.

The following steps were followed to assess the potential visual impacts of the proposed project:

A. Define the project location and setting.
B. Identify visual assessment units and key views.
C. Analyze existing visual resources, resource change and viewer response.
D. Depict (*or describe*) the visual appearance of project alternatives.
E. Create photo-simulations using photos of existing conditions.
F. Assess the visual impacts of project alternatives.
G. Propose measures to offset visual impacts.

Landscape Units and Key Views

A landscape unit is a portion of the regional landscape that can be thought of as an outdoor room that exhibits a distinct visual character. A landscape unit often corresponds to a place or district that is commonly known among local viewers.

The project area is divided into three landscape units The following Landscape Units and their associated key views have been identified. See figure 3-11.

Eureka Industrial Landscape Unit
Located between the Eureka Slough bridge and Airport Road
Key view 1: looking north from Cole Avenue

Eucalyptus Row Landscape Unit
Located between Airport Road and the Indianola Cutoff
Key view 2: looking north from Airport Road
Key view 3: looking north from the California Redwood Company
Key view 8: looking south from Indianola Cutoff
Key view 9: looking north, south, east, and west at Indianola Cutoff

Humboldt Bay Landscape Unit
Located north of Indianola Cutoff to 11th Street overcrossing in Arcata
Key view 4: looking north of Bayside Cutoff towards northbound Jacoby Creek bridge
Key view 5: looking south of the 101/255 interchange
Key view 7: looking south towards southbound Jacoby Creek bridge
Key view 6: looking south of Indianola Cutoff

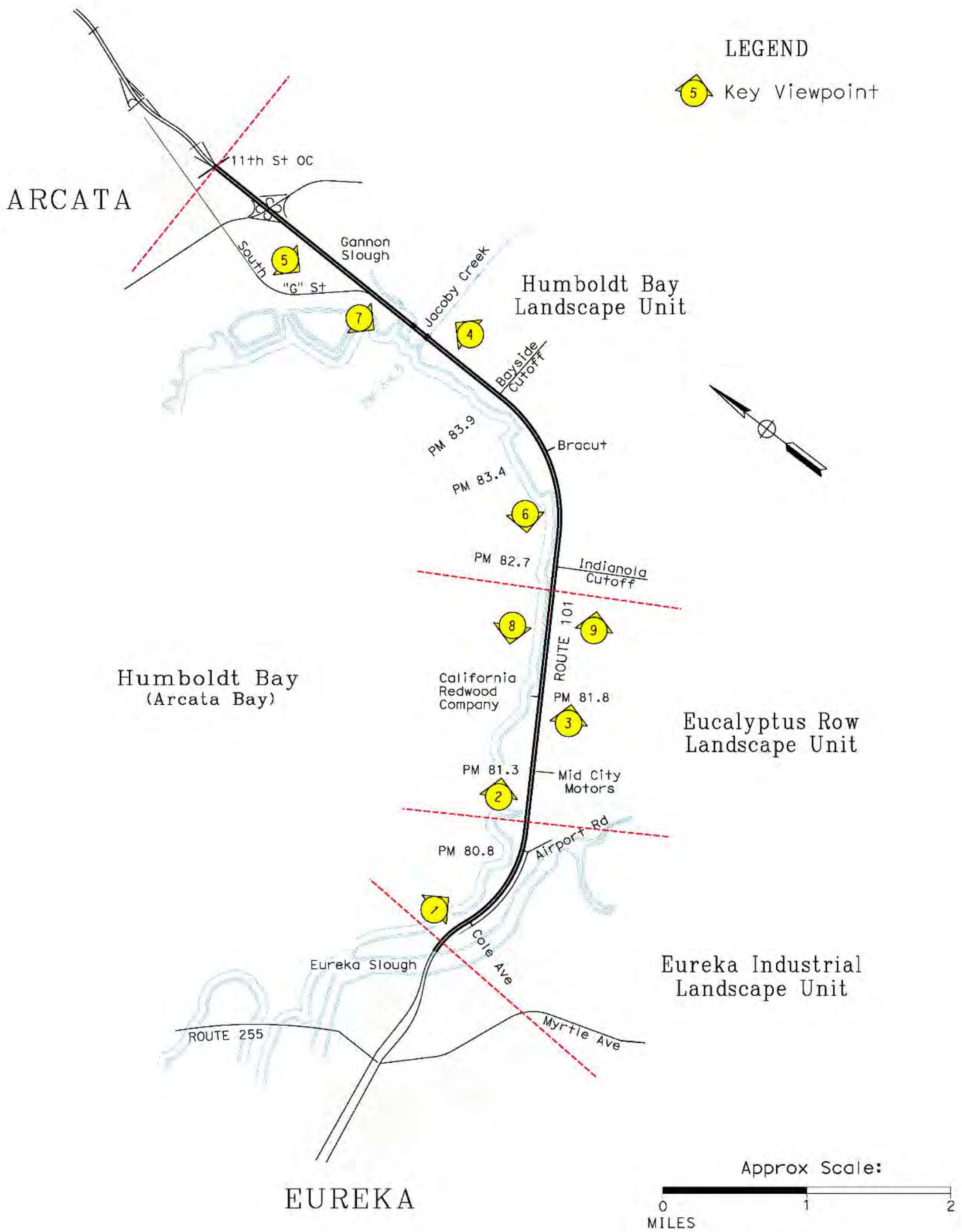

Figure 3-11 Landscape units and viewpoints along the corridor.

Note: The following descriptions of proposed views within each landscape unit have been modified in this Final EIR/S to expand the discussion by Alternative and reflect project changes (elimination of the removal of eucalyptus trees, inclusion of Modified Alternative 3A, and western extension of southbound Jacoby Creek bridge to include a bicycle and pedestrian path).

The process involved examining the existing visual setting on a regional scale and determining how the project would change the appearance of the corridor. As part of this process, visual character and visual quality within the project area were determined for both pre- and post-project conditions. Visual quality was assessed through an examination of the landscape characteristics of vividness, intactness, and unity.

Vividness is defined as the memorability of landscape components. Intactness refers to the visual integrity of the landscape and relative absence of visually encroaching elements. Unity refers to the compositional harmony of landscape components and coherence of features within a scene. Visual impacts were assessed based on the anticipated changes in the landscape caused by the project and the likely response to those changes by the public.

Proposed Views along the Eureka Industrial Landscape Unit

A cable median barrier is proposed for the median from the Eureka Slough bridge to Airport Road.

Airport Road and Highway 101 Intersection

For Alternative 1 and Alternative 2, the median crossing at Airport Road would be closed, paving removed, and the median seeded with California native grasses. The rural character would increase due to the grassy median being continuous from the Eureka Slough bridge to the Indianola Cutoff intersection. The visual quality would increase.

For Alternative 1A and Modified Alternative 3A, the Airport Road intersection would have a signal stopping northbound traffic to allow for left turn movements from southbound Route 101 onto Airport Road; continuous southbound traffic would not have a signal light. The southbound left turn lane allows for turnarounds (U-turns) at this location. The pavement would be widened to the east to allow for truck turning radius. Modified Alternative 3A would allow access southbound from Airport Road. The rural character would be adversely affected due to the increase in pavement for the turn lanes and northbound 3 lanes.

For Alternative 2, the median, southbound deceleration lane to Airport Road, and acceleration lane from Airport Road to Eureka would be closed and pavement removed. California native grasses would be planted where the pavement was removed. The visual quality would increase.

For Alternative 3, Airport Road would be realigned and the intersection would have a full signal. With the addition of a third northbound lane, the intersection would be broader and the rural quality of the area would be reduced. The adverse effect on visual quality would be low.

Signal lights are considered street furniture. (The term street furniture covers all types of traffic signs, direction signs, and other fixed items by the roadway for the safety and convenience of the public). For northbound traffic, the signal light at Airport Road is a continuation of the urban setting of Eureka. For southbound traffic, the signal light would alert travelers that they are approaching a more congested area.

Proposed Views along the Eucalyptus Row Landscape Unit

For all Alternatives except Alternative 1A, on the east side of Route 101 near the California Redwood Company (PM 81.95), one Monterey Cypress would be removed, which is within a grouping of Cypress trees. From a distance, the eucalyptus trees on the east side of the highway are similar in height to the western row of eucalyptus trees and would continue to bring a sense of balance to the corridor. There would be no visual impacts.

Alternative 1

Views along the Eucalyptus Row Landscape Unit would remain largely the same. The strong character of the eucalyptus trees would continue to be the dominant feature. Acceleration and deceleration lanes would be extended at the intersections of both Mid-City Motor World and California Redwood Company. The increase in roadway width required to lengthen the acceleration and deceleration lanes at California Redwood Company, and avoid impacts to the eucalyptus trees, would require the southbound lanes to shift eastward, narrowing the grassy median. The grassy median, which currently is 80 feet wide, would be narrowed to approximately 65 feet wide.

To the east, one Monterey Cypress tree is within the clear recovery zone at PM 81.97 and would be removed. The tree is within a deeply shaded stand of Monterey Cypress and the trees stand as a group rather than individually. There would be no adverse visual impact at PM 81.97.

Closing the medians at Mid-City Motor World and the lumber mill entrance by removing the pavement and seeding with native grass would increase the visual quality only slightly because the duration of the views are short. The visual quality would still be moderate to high.

Alternative 1A

Views along the eucalyptus row change as the traveler approaches Mid-City Motor World from the south. For approximately 440 feet, 30 of the southernmost eucalyptus trees would be removed for the two back-to-back U-turns. This is approximately 18 percent of the southern portion of row being removed. In addition to the 400 foot gap between the eucalyptus trees currently at the lumber mill entrance, the additional tree removal would expand the gap which lowers the visual intactness and vividness of the corridor.

Due to the turning radius needed for trucks at the U-turns, northbound lanes need to widen to the east. The roadway would be widened up to the slough. To prevent moving the slough which runs parallel to, and about 60 feet east of Highway 101, a 600-foot-long retaining wall would be placed close to the edge of the slough. The wall itself would not be seen from the highway; however, the barrier rail on top of the retaining wall would be visible. The barrier rail would be a see-through barrier with bicycle railing. The 8-foot-high wall and barrier rail would be visible by viewers from the Fay Slough Wildlife Area. However, the primary viewers are from the highway looking east towards the wildlife area and not from the wildlife area looking toward the proposed wall and highway. Although the retaining wall would not obscure any views since it would be constructed below the top of the roadway, the roadway widened to the slough's edge removes the continuous vegetated slope that currently exists which would change the visual character. The wall would have a low visual impact and the barrier rail would have a low-moderate visual impact.

North of the mill entrance on the eastern side at PM 81.95, older shrubs and 14 trees would be removed.

The gentle grass slope would be removed. Due to the proposed retaining wall's proximity to the slough, the traveler would not be able to see the slough through the barrier rail, but would be able to see the landscape beyond. Tree removal would increase the amount of open pastoral views to the east. This would change the character of the landscape. The loss of the continuous view of the slough would have an adverse low to moderate visual impact.

The U-turns, including their deceleration and acceleration lanes, add approximately 3,560 feet of paving, with an additional 1,930 feet of paving for the deceleration lane at Indianola Cutoff. Between the two U-turns and Indianola Cutoff, the 0.9 mile stretch would be three lanes wide to accommodate traffic.

Closing the medians at Mid-City Motor World and the lumber mill entrance by removing the road and seeding with native grass would only slightly increase the visual quality because the duration of the views is short.

Alternatives 2, 3, and 3A

Views along the eucalyptus row for Alternatives 2, 3, and Modified 3A would remain largely the same. The strong character of the eucalyptus trees would continue to be the dominant feature. For the southbound traveler, views change minimally as the road shifts east for approximately 2,400 feet and then shifts back to the current alignment. The new alignment would allow the existing guardrail and eucalyptus trees to remain, while providing room for deceleration and acceleration lanes for the lumber mill entrance. Overall, middle and background views would remain the same, as it would for northbound travelers.

One Monterey Cypress tree within a group of Monterey Cypress trees at PM 81.97 would be removed. The tree is within a deeply shaded stand of Monterey Cypress and the trees stand as a group rather than individually. There would be no adverse visual impact at PM 81.97.

Closing the medians at Mid-City Motor World and the lumber mill entrance by removing the pavement and seeding with native grass would only increase the visual quality slightly because the duration of the views are short.

Proposed Views along the Humboldt Bay Landscape Unit

Turnaround

Alternative 1A proposes a turnaround (U-turn) at PM 83.3 between Indianola Cutoff and Bracut. The northbound U-turn allows travelers to redirect southward towards Eureka. Due to the turning radius needed for trucks, Route 101 northbound lanes would need to be widened to the east, adjacent to Resale Lumber Products and the Caltrans Maintenance Station. This location would have a 2:1 fill slope. The U-turn would add a 560-foot-long deceleration and a 1,000-foot-long acceleration lane for ingress and egress to the businesses. The acceleration lane heading south would be an extension of the current acceleration lane at Bracut. Two trees on the slope adjacent to Resale Lumber Products would be removed.

Indianola Interchange

Alternatives 1 and 1A would close the existing median opening at Indianola Cutoff and extend the existing acceleration and deceleration lanes. There would be a slight increase to the visual quality due to the reduced paving and added native grasses at the intersection. There would be no visual impacts.

Alternatives 2, 3, and Modified 3A include a proposed Route 101/Indianola Cutoff compact diamond interchange, which would be substantially different in appearance than the existing at-grade intersection. The highway would be elevated approximately 25-feet above Indianola Cutoff. The on-ramps at the proposed Indianola Cutoff interchange would be approximately 1,200 to 1,800-feet-long, and the off-ramps would be approximately 1,968-feet-long.

Alternatives 2 and 3 would have separate north and southbound bridges approximately 112-feet-long with paved widths of 38-feet and guardrails and bridge barrier rails on both sides of each bridge. Modified 3A, a single bridge structure, would be used for northbound and southbound traffic with a median width of 22 feet with a median barrier.

The views of the Modified Alternative 3A grade separation would be similar to the grade separation proposed under Alternatives 2 and 3, but would occupy a smaller structural footprint by steepening the side slopes from 2:1 to 1.5:1.

If the interchange were constructed, affected viewers would include:

- Motorists on Route 101 as they approach and pass the new interchange from either direction;
- Westbound motorists on Indianola Cutoff as they approach the new interchange;
- A few residences, shoppers at the businesses within the vicinity of Indianola Cutoff; and
- Views from Humboldt Bay looking east toward the shore at the new interchange.

From Route 101, north and southbound views of Humboldt Bay and the surrounding landscape would be minimally blocked or disrupted by the new interchange. For persons traveling west on Indianola Cutoff, views of Humboldt Bay begin to open up near the top of the hill, just east of the Humboldt Area Foundation driveway. Views of Humboldt Bay would be reduced by approximately one-half due to the height of the highway blocking views of the bay's shores. The view would be of the Manila/Samoa peninsula with a sliver of the bay. Views of the bay are greatest at the top of the hill and become minimal as one approaches the flatter land closer to Route 101. From all locations traveling westward on Indianola Cutoff, the landform would change from flat pastureland to a “hill” which blocks all westward views. The change in the visual character would be permanent.

Because of the lower traffic volumes on Indianola Cutoff compared with Route 101, the number of viewers impacted is lower, however for those viewers the visual impact is high. There would be no feasible measures that would mitigate the loss of views of Humboldt Bay caused by the new interchange.

Providing landscaping at the interchange would soften the straight lines of the interchange structure. The goal would be to beautify the interchange without causing additional blockage of views of Humboldt Bay.

Tree Removal

For Alternatives 1, 2, 3, and Modified 3A, the removal of some eucalyptus trees near the proposed interchange would result in a positive visual impact. At the terminus of the eucalyptus tree row, any adverse visual impact due to tree removal is offset by increased views of Humboldt Bay and increases the visual quality at this location.

Construction of the interchange, including the on- and off-ramps, would require the removal of all the trees to the east. The commercial area on the southeast quadrant has a low visual quality which is partially hidden by the existing vegetation. Tree removal would open up views of the area and increase adverse visual impacts. The visual quality would continue to be low for 3 to 5 years until replanted young trees growth in height and breadth.

Between Bracut and Bayside Cutoff, proposed tree removal to the east would occur by Resale Lumber Company. The views have a low visual quality and are partially hidden by the existing vegetation. Tree removal would open up views of the commercial area and increase adverse visual impacts. The visual quality would continue to be low for 3 to 5 years until replanted young trees grow in height and breadth. To increase the length of the deceleration lane at Bayside Cutoff, several trees would be removed which increases the amount of open pastoral views to the east and provides less variation in the landscape.

See Figures 3-12 through 3-20: a map of the photograph view points and photographs of the existing and proposed views of the interchange.

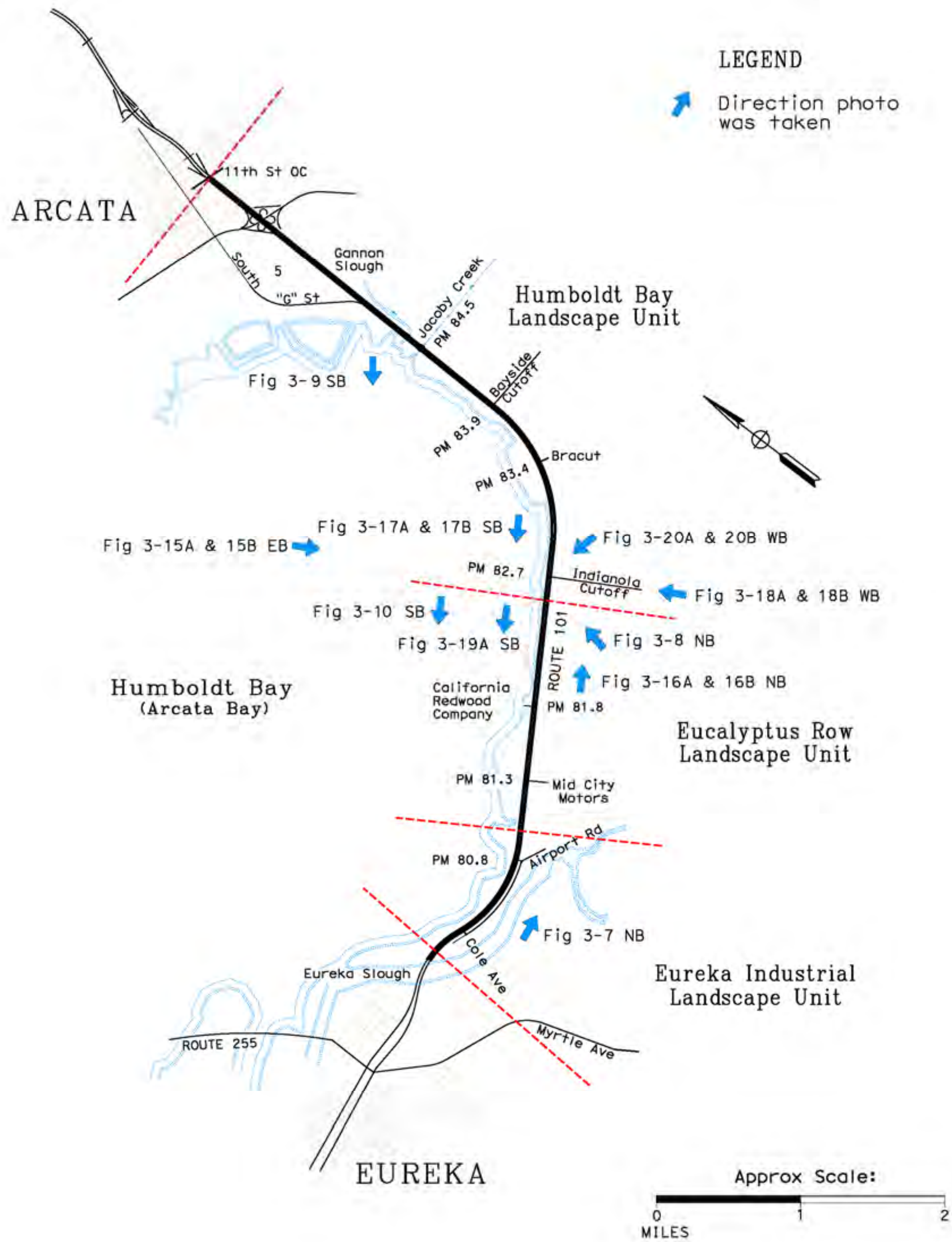

Figure 3-12 Locations of photo simulation view points.

Figure 3-13 Proposed Alternative 3 Interchange Design Configuration

NOTE: Modified Alternative 3A would appear similar to this photo-simulation

Figure 3-14A Alternative 3 Grade Separation with Standard Median and Slopes

Figure 3-14B Modified Alternative 3A Grade Separation with Narrow Median and Steep Slopes

Figure 3-15A Aerial Photograph of Existing Route 101/Indianola Intersection Facing East

Figure 3-15B Photosimulation of Proposed Grade Separation (Alternatives 2 and 3) at Indianola Cutoff

NOTE: Modified Alternative 3A would appear similar to this photo-simulation

Figure 3-16A Photograph of Existing Northbound Route 101 South of Indianola Cutoff Facing North

Figure 3-16B Photosimulation of Modified Alternatives 3A Proposed Grade Separation South of Indianola Cutoff Facing North

Figure 3-17A Photograph of Existing Southbound Route 101 Facing Indianola Cutoff Facing South

Figure 3-17B Photosimulation of Modified Alternative 3A Proposed Grade Separation Facing South

Figure 3-18A Photograph of Existing Route 101 Facing Humboldt Bay from Indianola Cutoff

Figure 3-18B Photosimulation of Alternatives 2 and 3 of Proposed Grade Separation Facing Humboldt Bay from Indianola Cutoff

Figure 3-19A Photograph of Existing Southbound Route 101 from the Railroad at Indianola Cutoff Facing South

Figure 3-19B Photosimulation of Modified Alternative 3A Proposed Grade Separation from the Railroad at Indianola Cutoff Facing South

Figure 3-20A Oblique Photograph of Existing Indianola/Route 101 Intersection Facing Northwest

Figure 3-20B Oblique Photo simulation of Alternatives 2 and 3 Proposed Route 101/Indianola Grade Separation Facing Northwest

Removing pavement from the median and replacing it with California native grass would only slightly increase the visual quality because the duration of the view is short.

Jacoby Creek and Gannon Slough Bridges

Proposed bridge work on three bridges involves replacing railing on the northbound Jacoby Creek and Gannon Slough bridges and replacing the entire southbound Jacoby Creek bridge. Proposed bridge work includes installing a see-through barrier rail with bicycle railing, which would enhance views of the slough on the east. The see through barrier rail has been accepted by the California Coastal Commission at other coastal locations. See Figure 3-21.

Figure 3-21 Example of see through Bridge Rail with Pedestrian/Bicyclist Rail

Bridge construction at Jacoby Creek would require removal of the Monterey Pines in the median. For northbound travelers, the trees are reminiscent of the corridor effect of the eucalyptus trees. For southbound travelers, the trees provide the first vertical element in the landscape. Without the trees, the pastoral, wide panoramic quality of the landscape would increase. Bridge work would be the same for all five Build Alternatives. The installation of see-through barrier railing would enhance visual quality compared to the existing conditions.

The City of Arcata is proposing to construct a trail between the railroad tracks and the highway. This is Phase II of the Humboldt Bay Trail project and would run from Arcata to Bracut. Phase III would extend the trail south from Bracut to Eureka, providing a safe area for the public to cycle, walk, and run, etc., along Humboldt Bay between Arcata and Eureka. The new trail(s) would join up to existing trails in the cities of Eureka and Arcata. The City of Arcata is pursuing a separate bridge across Jacoby Creek. They have also requested a western extension of the bridge deck so that it serves as a bridge across Jacoby Creek for the Humboldt Bay Trail.

The new southbound bridge at Jacoby Creek would be wider than the existing bridge to accommodate a 10-foot wide shoulder and a see-through barrier railing on the western (bay) side and a 5-foot wide shoulder on the eastern side. The bridge deck surface would be made of concrete and would be a lighter color than the adjacent asphalt roadway. If the City of Arcata does not pursue a separate bridge across Jacoby Creek for their trail project, the bridge deck would extend an additional 10-feet to the west to allow for a barrier-separated travelway for bicyclists and pedestrians as part of a future trail. A bicycle rail would not be required on top of the barrier rail since it is adjacent to pavement at the same level. A pedestrian railing would be placed on the west side of the trail—either as part of this project or in the future when the trail is built.

The visual character at the new bridge would differ from existing conditions. The difference would not be so much in the widened bridge deck and see-through barrier rail for the highway, but for the extension of the bridge deck to serve as a bridge crossing for the future trail. In addition to the expansion of the flat surface of the paving material, and its light color which contrasts with the adjacent asphalt roadway, the pedestrian railing would introduce a new element not currently seen along the corridor. The railing is expected to be 4.5 feet high for bicycle safety, however, the design of the railing has not yet been determined. A few feet west of the bridge is an old wooden railroad bridge with railing in disrepair which would be mostly obscured from view as the pedestrian railing would have balusters spaced approximately 4 inches apart. The natural wood elements of the railroad bridge would be visually pleasing in the bayside/marsh landscape. The pedestrian rail should be designed and constructed of material and color to blend in with the marsh landscape.

Views of the southbound Jacoby Creek bridge are from the southbound direction only. The proposed bridge is 80 feet long. The current speed limit is 65 mph and drivers pass over the bridge within seconds. Cyclists on the highway have more time to notice the details of Jacoby Creek and the bay to the west. Widening the bridge by an additional 10 feet would reduce views of Jacoby Creek, the marsh and edge of the bay. This would lower the visual quality.

Median Barrier

Beginning at South G Street northward, a cable median barrier is proposed to replace the existing thrie beam barrier. At South G Street, the median width is 24-feet for approximately 1.6 miles. The median remains at a 24-foot width until 650-feet north of the 7th Street overcrossing, at which point the final 525-feet of median widens up to 54-feet of pavement and barrier. Views through the cable median barrier would remain the same. There would be no visual impact.

Summary of Project Visual Impacts

Key Viewpoint 1: looking north from Cole Avenue

Major visual change: Install cable median barrier between Eureka Slough bridge and Airport Road

There would be a minimal visual impact.

Key Viewpoint 2: looking north from Airport Road

Major visual change: Realign and signalize Route 101/Airport Road intersection, cable median barrier, three lanes of northbound travel, signal light

This would be a low-moderate visual impact.

Key Viewpoint 3: looking north from California Redwood Company

Major visual change: Tree and Shrub Removal

Eucalyptus tree removal on the west has been removed from the project. For Alternatives 1, 2, 3, and Modified 3A, vegetation removal would be minimal, consisting of 1 Monterey Cypress and 5 older shrubs. Pastoral views to the east would open up due to shrub removal which would increase the visual quality. There would be no visual impacts.

The following is a summary of the estimated tree takes by Alternative. The tree take count could change during final project design and other factors.

Alternative	Estimated number of mature (≥ 24 inches) trees removed
1	4
1A	83
2, 3	64
Modified 3A	23

For Alternative 1A, there would be adverse visual impacts to the west and east due to tree removal, increase in roadway width, narrow median, and pavement up to the slough with railing on top.

Key Viewpoint 4: looking north of Bayside Cutoff towards northbound Jacoby Creek bridge

Major visual change: Widen northbound Jacoby Creek and Gannon Slough bridges

This would be a low visual impact.

Key Viewpoint 5: looking south of the 101/255 interchange

Major visual change: Install cable median barrier in Arcata south to South G Street

The project does not include a concrete median barrier, but a cable median barrier. This is a low visual impact.

Key Viewpoint 6: looking south of Indianola Cutoff

Major visual change: Install metal beam guardrail at billboards

This would have no visual impact.

Key Viewpoint 7: looking south towards southbound Jacoby Creek bridge

Major visual change: Replace southbound Jacoby Creek bridge (See Figure 3-21 for an example of the proposed barrier rail for the Jacoby Creek bridges and northbound Gannon Slough bridge.)

This would have a low-moderate visual impact.

Key Viewpoint 8: looking south from Indianola Cutoff

Major visual change: Partial removal of Eucalyptus Tree Row, north end near Indianola Interchange.

This would have no visual impact.

Key Viewpoint 9: looking north, south, east and west at Indianola Cutoff

Major visual change: Indianola Cutoff Interchange

The proposed Indianola Cutoff interchange (including Modified Alternative 3A) would be substantially different in appearance than the existing intersection, and would have moderate-high visual impact.

Overall:

The introduction of highway elements such as median barriers and increased road pavement for lengthened acceleration and deceleration lanes would reduce the rural character in those sections of the corridor. The long duration views of these elements would result in low and moderate visual impacts.

A new interchange for Alternatives 2, 3 and Modified 3A would alter the rural, open space setting of the existing intersection by introducing a change in the landform, which would have a moderate impact on the visual quality of the entire corridor. These impacts would reduce the rural character of the corridor because of the addition of an overpass interchange.

There would be low loss in the visual character for the entire corridor due to reducing the rural landscape. Indicators of overall loss are the increase in pavement for additional lanes, the addition of a center median barrier, and the addition of a conventional freeway interchange.

The preferred project alternative, Modified 3A, does not include removal of 50 percent of the eucalyptus trees along the Eureka–Arcata highway corridor; therefore, the project would not substantially change the visual character provided by the trees.

Alternative 1 would have no impact on the visual quality of the corridor.

Alternative 1A would have a low impact on visual quality of the entire corridor. These impacts would be from reducing the rural character of the corridor because of a narrower median, the median barrier and additional lanes.

None of the alternatives have significant impacts to visual resources.

After circulation of the Draft EIR/EIS, there was substantial negative public response to removal of the eucalyptus trees along the corridor. Design changes were made, and the lanes were shifted south and east to avoid the removal of these trees.

AVOIDANCE, MINIMIZATION, AND/OR MITIGATION MEASURES

Caltrans and the FHWA mandate that a qualitative/aesthetic approach should be taken to mitigate for visual quality loss in the project area. This approach fulfills the letter and the spirit of FHWA requirements because it addresses the actual cumulative loss of visual quality that would occur in the project view shed when the project is implemented. It also constitutes mitigation that can more readily generate public acceptance of the project. This approach also results in avoidance, minimization, and/or mitigation measures that can lessen or compensate for a loss in visual quality. These would be designed and implemented with concurrence of the District Landscape Architect.

The following measures to avoid or minimize visual impacts would be incorporated into the project:

Erosion control

Provide low growing California native grass species in obliterated median areas and to all soils disturbed by construction.

Barrier railing

Barrier railing for all bridges, retaining wall (Alt. 1A), and the overcrossing at the interchange would be consistent in type and color.

Billboards

Remove billboards on bay side as much as possible.

Eureka Industrial Landscape Unit

No avoidance, minimization, or mitigation measures are necessary.

Eucalyptus Row Landscape Unit

At the Intersection of Route 101 and Airport Road, plant shrubs on the east side of the highway.

Humboldt Bay Landscape Unit

At the Indianola Interchange, plant native coastal trees and shrubs at a ratio of 2:1 (replaced:removed) at the on- and off-ramps on the east side of Route 101. Plant low-growing native shrubs at on- and off-ramp slopes on the west side of Route 101. Plant native shrubs and low-growing trees on slopes of the overcrossing.

From Indianola Cutoff to Bracut, plant new fill slopes for deceleration lane at Resale Lumber Products, PM 83.2 to 83.35 with native trees from 5-15 gallon containers and shrubs from 1 gallon, or similar, containers.

From Bracut to Bayside Cutoff, replace removed trees with native Bishop Pine *(Pinus muricata)*in 5-15 gallon containers.

At the Jacoby Creek and Gannon Slough bridges, northbound, replace removed trees required for bridge construction with Bishop Pine *(Pinus muricata*) in 5-15 gallon containers.

From Jacoby Creek bridges to 11th Street overcrossing in Arcata, no avoidance, minimization, or mitigation measures are necessary.

At Jacoby Creek bridge, southbound, darken the bridge deck west of the edge of traveled way by staining or integral colorant in the concrete. This includes the shoulder and pedestrian path.

At the metal beam guardrails by billboards, no avoidance, minimization, or mitigation measures are necessary.

After measures to minimize harm are implemented, visual impacts would still be adverse in the short term (between three to five years after construction) while plantings take root and grow in the disturbed areas. Removing the most northern eucalyptus trees would have a positive effect by opening views of Humboldt Bay. In the long term, beyond three to five years, trees replanted at key locations would develop height and breadth and the quality of the pre- construction visual setting would be expected to slowly re-establish itself.

CONCLUSION

The proposed project area is between two municipalities set within the larger rural setting of Humboldt County in northern California. The recommended minimization measures would help reduce the visual impacts of the proposed project. With minimization measures, the interchange would have a low-moderate visual impact. The project would have a low visual impact on the corridor overall. With the incorporation of avoidance, minimization, and mitigation measures, there would be a less than significant impact to aesthetics in the project area.

A Federal Consistency Certification from the California Coastal Commission was finalized on November 14, 2013 for the proposed project. The California Coastal Commission determined Modified Alternative 3A would comply with the Chapter 3 of the Coastal Act with the following condition regarding visual resources:

> *Visual Impact Mitigation. Prior to or concurrent with its submittal to the Commission of a coastal development permit application for the project at issue, Caltrans will develop and submit a plan to the satisfaction of the Executive Director to provide mitigation for the visual impacts of the project by removing, to the maximum extent feasible, all billboards along the corridor, as well as other overhead infrastructure (such as power poles and power lines),*
>
> *(Source: California Coastal Commission, 2013)*

Caltrans is in the process of assessing the potential for billboards that could be removed. The exact location has not been determined.

3.1.8 Cultural Resources

NOTE: *Not all information about cultural resources can be fully disclosed to the public. The location of an archaeological site is exempt from disclosure to the public by law in order to protect sites. Site locations can be disclosed to archaeologists who sign confidentiality agreements with the repositories which house the records (California Historical Resources Information Centers).*

REGULATORY SETTING

"Cultural resources" as used in this document refers to all historical and archaeological resources, regardless of significance. Laws and regulations dealing with cultural resources include:

The National Historic Preservation Act of 1966, as amended, (NHPA) sets forth national policy and procedures regarding historic properties, defined as districts, sites, buildings, structures, and objects included in or eligible for the National Register of Historic Places. Section 106 of NHPA requires federal agencies to take into account the effects of their undertakings on such properties and to allow the Advisory Council on Historic Preservation the opportunity to comment on those undertakings, following regulations issued by the Advisory Council on Historic Preservation (36 CFR 800). On January 1, 2014, a Section 106 Programmatic Agreement (PA) between the Advisory Council, FHWA, State Historic Preservation Officer (SHPO), and Caltrans went into effect for Caltrans projects, both state and local, with FHWA involvement. The PA governs the implementation of the Federal-aid Highway Program in California (36 CFR 800.14(b)) and the PA implements the Advisory Council's regulations, 36 CFR 800, streamlining the Section 106 process and delegating certain responsibilities to Caltrans.

Historic properties may also be covered under Section 4(f) of the U.S. Department of Transportation Act, which regulates the "use" of land from historic properties. See Appendix B for specific information regarding Section 4(f).

Historical resources are considered under the California Environmental Quality Act (CEQA), as well as California Public Resources Code (PRC) Section 5024.1, which established the California Register of Historical Resources. PRC Section 5024 requires state agencies to identify and protect state-owned resources that meet National Register of Historic Places listing criteria. It further specifically requires Caltrans to inventory state-owned structures in its rights-of-way.

AFFECTED ENVIRONMENT

In order to evaluate historic architectural and archaeological resources, an Area of Potential Effects (APE) map was prepared to identify all areas that have the potential to be either directly or indirectly affected by the project's activities. The APE map also includes all construction easements, areas that are perceived to have the potential to be used for construction staging/storage, as well as all evaluated archaeological and architectural properties.

The following cultural resources studies were completed for this project:

- *Historic Resources Evaluation Report*: Eureka to Arcata Route 101 Corridor Improvement Project, Humboldt County, CA; Author: JRP Historical Consulting Services.

- *Supplemental Historic Resources Evaluation Report*: Eureka to Arcata Route 101 Corridor Improvement Project, Humboldt County, California; Authors: Judy Tordoff, Principal Investigator-Historic Archaeology, Kimberly Wooten, Co-Principal Investigator-Historical Archaeology, and Janice Calpo, Principal Architectural Historian.

- *Archaeological Survey Report*: Eureka to Arcata Route 101 Corridor Project, Humboldt County, California; Authors: Sally Salzman Morgan, Brian Hatoff, and Sean David Dexter, URS Corporation.

- *Supplemental Archaeological Survey Report* for the Eureka-Arcata Corridor Projects, State Route 101, Humboldt County, California. Author: Timothy Keefe, Co-Principal Investigator - Prehistoric Archaeology.

Pre-Historic and Historic Archaeology

Archaeological surveys were conducted between December 2 through December 6, 2002 and on August 2, 2005. The Archaeological Area of Potential Effects (APE) linearly extends along Route 101 from just north of the city of Eureka at the Eureka Slough to the intersection of Route 101 and 11th Street in Arcata. The width of the Archaeological APE generally encompasses the existing State right-of-way, with widened areas that include all potential construction locations (including those needing construction easements), the potential new intersection area at Indianola Cutoff, and the potential new intersection area at Airport Road. The area that was surveyed and the resources addressed were primarily located within the existing State right-of-way. The area that was surveyed extends from just north of the city of Eureka at the Eureka Slough, and north for approximately six miles to West End Road in the city of Arcata. Complete intensive archaeological surveys extended from the paved highway margin to the outer edge of the highway rights-of-way on both sides of Route 101. At one location, a strip about 10 feet beyond the existing right-of-way was surveyed.

A 1930s era dumpsite that is located within the project's Archaeological APE has been determined eligible for the purposes of this project. A portion of this dumpsite is located within the area of direct impact for the project; however, this portion was evaluated as not eligible for the National Register of Historic Places. The location of an archaeological site is exempt from disclosure to the public by law in order to protect sites from looters. In accordance with 16 USC 470w-3(a), 36 CFR 800.11(c), site locations can be disclosed to cultural resource professionals who sign confidentiality agreements with the repositories that house the records (California Historical Resources Information Centers).

Historic Architecture and Landscaping

Consistent with Caltrans policies and general cultural resource practices, the architectural APE includes the area directly impacted by construction as well as taking into consideration the potential for indirect effects. Where the existing highway right-of -way is extensive and proposed work is minimal, the architectural APE conforms to the existing right-of-way. Only those resources located within the architectural APE were included in the survey.

After the APE was defined, a reconnaissance survey was conducted of the area to account in the field for all the buildings, structures, and objects found within the APE. This field reconnaissance helped to determine which buildings appeared to be more than 45 years of age and would therefore be studied for this project. Additional background research was done through First American Real Estate Solutions commercial database, review of historic and current USGS topographic maps, and other documents to confirm dates of construction. While the Secretary of Interior sets the standard guideline for review of potential National Register eligible buildings (properties that are 50 years of age or older), this age limit has been extended to include resources constructed in 1960 or before to account for lead-time between preparation of environmental documentation and actual project construction.

The investigation of historic-era properties included research regarding their historical context, as well as resource-specific research conducted in both archival and published records. Research for this project was conducted at the California State Library, the Humboldt County Historical Society, the Humboldt Room of Humboldt State University, the California Department of Transportation Library (Headquarters in Sacramento), Caltrans District 1 Maps and Plans Office, the Earth Sciences and Map Library at University of California, Berkeley, and the Shields Library at University of California Davis. The project team also undertook personal interviews.

Fr the purposes of this project, a portion of Murray Field Airport has been determined to meet National Register criterion C, at the local level of significance, for the architecture of the original 1930s hangar that is central to the airport and its history. This structure also retains a high degree of integrity. The boundaries of this historic property extend to the immediate tarmac surrounding the hangar, but not to the extent of the entire property as runway configurations have changed dramatically over time and newer structures have been added to other areas of the airport.

A portion of the Batini Dump, a refuse dump that dates to the 1930s, is located within the area of direct impact (ADI) for this project. This portion was evaluated as not eligible for the NRHP. The remaining portion of the dump is located to the east on private property outside the ADI. Pursuant to Stipulation VIII.C.3 of the PA, Caltrans is considering this portion of the Batini Dump eligible for the NRHP under criterion D for the purposes of the present undertaking without conducting further subsurface testing or surface collection. An environmentally sensitive area would be established and enforced to ensure there would be no adverse effects to this property as a result of the proposed undertaking pursuant to Stipulation X.B.1.a.

During the circulation of the Draft Environmental Impact Report/Statement, many public comments stated that the road and its adjacent items (trees) should have been considered as a historic (cultural) landscape. Caltrans did consider the trees in this context, in accordance with the criteria set forth in National Register Bulletin 18 (Guidelines to Evaluate and Nominate Designed Historic Landscapes), which states:

> A designed historic landscape is defined as a landscape that has a significance as a work of art; was consciously designed and laid out by a master gardener, landscape architect, architect or horticulturist to a design principle, or an owner or other amateur using a recognized style or tradition in response or reaction to a recognized style or tradition; has historical association with a significant person, trend, event, etc. in landscape architecture; a significant relationship to the theory or practice of landscape architecture.

The potential for this stretch of roadway to be considered a historic (cultural) landscape was considered and Caltrans determined that it does not meet any of the criteria to be considered an eligible historic landscape. As the result of Caltrans cultural resources studies for the proposed project concluded, the roadway along Humboldt Bay has been substantially altered as a result of the widening of the road from a two-lane road (its historic context) to a four-lane road with interior median. This change effectively compromised the roadway's historical integrity in that it no longer retains the engineering and design features that it possessed when originally designed and built. Thus, Caltrans determined that the roadway cannot be considered a historic landscape.

Although the aesthetic value and long-standing origin of these trees is recognized, the HRER attachment to the HPSR has recorded, evaluated and discussed in detail the trees for their potential as historic resources, and concluded, as concurred by State Historic Preservation Officer, that the trees did not stand alone as eligible for the National or California Register, nor as part of a historic landscape. *(Source: Caltrans Historic Property Survey Report for the Proposed Eureka-Arcata Corridor Projects, 2006)* Although new information about the origin of the trees is presented in a letter from the Eureka Heritage Society, it is the finding of Caltrans staff that the trees still do not meet the criteria for National or California Register eligibility, either alone, or as part of a historic landscape. The possibility of the trees contributing to a historic corridor has been negated by the lack of integrity the corridor otherwise possesses in relation to its period of significance.

Presently, this roadway is distinguished from others by its location alongside Humboldt Bay. This is an aesthetic or scenic value that alone does not qualify a resource for significance under the National Register or California Register criteria. Concerns about this issue are addressed in Chapter 3, Section 3.1.7. —Visual / Aesthetics.

ENVIRONMENTAL CONSEQUENCES

Under the authority of FHWA, Caltrans has determined a Finding of No Adverse Effect with Standard Conditions, is appropriate for this project undertaking according to Section 106 PA Stipulation X.B(2) and 36 CFR 800.5(b).

The State Office of Historic Preservation sent a letter of concurrence, dated November 29, 2006, regarding all evaluated properties, except one, in terms of eligibility for the National Register of Historic Places (NRHP). The letter included a concurrence with the Caltrans determination that 17 properties evaluated are not NRHP eligible. The letter did not concur with Caltrans' NRHP eligibility determination that a portion of the Murray Field Airport is eligible, but recommended it be treated as NRHP eligible. In addition, the letter concurred with the Finding of No Adverse Effect with standard conditions in terms of the project's overall effects to cultural resources. A copy of the State Office of Historic Preservation letter is included in Appendix M.

Resources Evaluated Relative to the Requirements of Section 4(f)

Section 4(f) of the Department of Transportation Act of 1966, codified in federal law at 49 U.S.C. 303, declares that "it is the policy of the United States Government that special effort should be made to preserve the natural beauty of the countryside and public park and recreation lands, wildlife and waterfowl refuges, and historic sites."

Within the Section 106 area of potential effects (APE), there are two protected Section 4(f) resources (historic sites).

1. A portion of the Batini Dump (a refuse dump dating back to the 1930s). All Build Alternatives would avoid the NRHP eligible portion of the Batini Dump. Additional right-of-way acquisition for project construction of any portion of the Batini Dump is not required.

2. The Murray Field Airport, as discussed previously, should be treated as NRHP eligible. Alternative 3 would require acquisition of the non-NRHP eligible portion of the airfield, which is owned by the County of Humboldt. As previously discussed, the State Office of Historic Preservation finding concurred with the Finding of No Adverse Effect in terms of the project's overall effects to cultural resources.

All Build Alternatives would avoid the use of the two Section 4(f) protected historic resources. The construction of Alternative 3 would require an encroachment permit for road construction within a portion of the airport that is not historic. Refer to Appendix D for more information.

AVOIDANCE, MINIMIZATION, AND/OR MITIGATION MEASURES

All project alternatives, except Alternative 3, would avoid cultural resources. As stated previously, right-of-way acquisition from the Murray Field Airport does not include the National Register of Historic Places eligible portion of the airport.

The portion of the archaeological site located near, but outside of the Caltrans right-of-way, would be identified as an Environmentally Sensitive Area on final project construction plans. High visibility mesh fencing would be placed along the border of the site at the Caltrans right-of-way prior to construction activities, and construction personnel would be directed to keep all equipment and activities outside of the fenced area.

Although no intact archaeological sites are known to occur entirely within the project Archaeological APE, the Table Bluff Wiyot Tribe deems portions of the project sensitive for potential cultural resources. (See Chapter 5 for more information on Tribal Coordination.) Through consultation between Caltrans and the Table Bluff Wiyot Tribe, it has been agreed to monitor these locations in the event that items of significance to the Tribe are unearthed during earthmoving activities. If cultural materials were discovered during construction, all earth-moving activity within and around the immediate discovery area would be diverted until a qualified archaeologist could assess the nature and significance of the find.

If human remains were discovered, State Health and Safety Code Section 7050.5 states that further disturbances and activities shall cease in any area or nearby area suspected to overlie remains, and the County Coroner contacted. Pursuant to Public Resources Code Section 5097.98, if the remains are thought to be Native American, the coroner would notify the Native American Heritage Commission (NAHC) who would then notify the Most Likely Descendent (MLD). At that time, the person who discovered the remains would contact the Caltrans Archaeologist who may work with the MLD on the respectful treatment and disposition of the remains.

No other measures to minimize harm or mitigation would be necessary, since there are no anticipated temporary or permanent potential impacts to cultural resources.

3.2 Physical Environment

3.2.1 Hydrology and Floodplain

NOTE: See Chapter 4 for information regarding future sea level rise.

REGULATORY SETTING

Executive Order 11988 (Floodplain Management) directs all federal agencies to refrain from conducting, supporting, or allowing actions in floodplains unless it is the only practicable alternative. The Federal Highway Administration requirements for compliance are outlined in 23 CFR 650 Subpart A.

In order to comply, the following must be analyzed:

- The practicability of alternatives to any longitudinal encroachments,
- Risks of the action,
- Impacts on natural and beneficial floodplain values,
- Support of incompatible floodplain development,
- Measures to minimize floodplain impacts and to preserve/restore any beneficial floodplain values impacted by the project.

The base floodplain is defined as "the area subject to flooding by the flood or tide having a one percent chance of being exceeded in any given year." An encroachment is defined as "an action within the limits of the base floodplain."

AFFECTED ENVIRONMENT

The Route 101 roadway is mostly straight and level between Eureka and Arcata. Route 101 is east of the Northwestern Pacific Railroad (NWPRR) and the railroad track embankment is adjacent to the Arcata Bay. Both the Route 101 roadway and railroad embankment are at the same approximate elevation. The adjacent land area is largely pasture with some publicly owned wildlife refuges and pockets of commercial, industrial, and housing uses. North of the Highway 101/255 interchange in Arcata, the area is dominated by urban development.

South of the Highway 101/255 interchange in Arcata, the area historically was a diverse system of tidal and freshwater sloughs with a variety of meandering streams and estuaries that drained to Humboldt Bay at various locations. Because of the high groundwater and saturated soil conditions, the land is mainly used for pastureland. Development and land uses within this area include an airport, a campground, automobile dealerships, building supply stores, agricultural support structures, a mobile home park, and a variety of other businesses. There are also wildlife refuges on both sides of Route 101.

The natural and beneficial floodplain values within the project area include wetlands, fish, wildlife, plants, open space, natural beauty, scientific study, outdoor recreation, pastureland, natural moderation of floods, and water quality maintenance. These values, with the exception of the flood moderation, are discussed in detail in the Water Quality, Wetlands, Vegetation, Wildlife, Visual, and Community Impact sections of this chapter. Flood moderation is discussed in the Environmental Consequences section.

In total, approximately 80 square miles of watershed drain into the bay through this segment of highway. Freshwater Creek, Jacoby Creek, and Gannon Slough tributaries are the larger contributors. Eureka Slough and Brainard's Slough, with tributaries Rocky Gulch and Washington Gulch, also contribute runoff and tidal flow through this segment of highway.

For purposes of simplifying the necessary analysis, the floodplain areas and their contributing watersheds were grouped based upon natural drainage boundaries. A natural boundary exists near the Bracut intersection. The area around Bracut was originally called Brainard's Ridge before it was excavated in 1918 and again in 1955, then it was called Brainard's Cut, and eventually shortened to Bracut. The elevation of Bracut and the remaining ridgeline are higher than the adjacent land to the north and south, thereby creating a distinct drainage separation. For this reason, floodplain areas and contributing watersheds were divided into the northern watershed and the southern watershed.

Major tributaries of the southern watershed include Freshwater Creek, Ryan Creek, and several smaller unnamed tributaries. All waters that enter this watershed drain to Humboldt Bay through the Eureka Slough. A large portion of the water within this section drains to the Eureka Slough via an approximately 35-foot wide, 6-foot deep, 15,700-foot long channel. The channel originates immediately south of Bracut and flows adjacent to the highway beneath Indianola Cutoff via a culvert, approximately 150-feet east of the highway. It then flows south, adjacent to the highway, then east along Airport Boulevard for approximately 500-feet before the channel discharges directly into Eureka Slough through two culverts. The two culverts are equipped with tide gates. These two tide gates keep tidal waters from inundating the southern watershed floodplain. In this section of highway, there are cross culverts that flow underneath the highway and drain directly into the bay. The Route 101 roadway median runoff in this section drains east through several pipes that outlet into the channel. California Redwood Company (Simpson), which lies west of Route 101, drains under the highway into the 15,700-foot long channel.

Major tributaries in the northern watershed include Rocky Gulch, Washington Gulch, Jacoby Creek, Old Jacoby Creek, and drainage that originates from the city of Arcata and neighboring pasturelands. Washington Gulch and Rocky Gulch flow into Brainard's Slough, which controls all inflow/outflow using three tide gates at various locations. Old Jacoby Creek flows under the highway and is controlled by a tide gate. Jacoby Creek and Gannon Slough waters flow under highway bridges to the bay. Gannon Slough has tide gates controlling waters that enter the slough from the city of Arcata and surrounding pasturelands. Jacoby Creek and Washington Gulch are the only tributaries in the northern watershed that drain to the bay with no tide gates to control tidal influences.

The highway median throughout the Route 101 corridor between Eureka and Arcata is generally depressed (below the level of the road). The median is typically 80 feet wide and has a variable depth. Some sections of the median are below high tide elevations of the adjacent Arcata Bay and water can accumulate in the median from rainfall; the elevation of this water can vary depending upon tides and groundwater conditions.

The Route 101 corridor between Eureka and Arcata initially consisted of a two-lane highway built in 1918 (presently the southbound lanes). This section was partially reconstructed and expanded into four lanes between 1954 and 1956. During this construction, the drainage systems were upgraded to facilitate outflow from the watersheds and to reduce tidal influences.

Floodplain

To identify a community's flood risk, the Federal Emergency Management Agency (FEMA) conducts a Flood Insurance Study. The study includes statistical data for river flow, storm tides, hydrologic/ hydraulic analyses, and rainfall and topographic surveys. FEMA uses this data to create the flood hazard maps that outline flood risk areas. The flood hazard maps are known as Flood Insurance Rate Maps, or FIRMs.

The FEMA FIRMs for Humboldt Bay and vicinity indicate portions of Route 101 and adjacent lands lie within Zone A, Zone C, and Zone V floodplains. Zone A is defined as "Areas of 100-year flood; base flood elevations and flood hazard factors not determined." Zone C is defined as "Areas of Minimal Flooding." Zone V is defined as "Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors not determined."

Figures 3-22 A and B show the project limits within a composite of FEMA Flood Insurance Rate Maps. FEMA mapping is based on the NGVD29 datum[13]; Caltrans project data is based on the NAVD88 datum. Spot elevation of project components shown on this map are based on Caltrans survey data converted to the FEMA mapping datum. For example, on Figure 3-22A, the elevation at Bracut is 17.3 feet above mean sea level NGVD29, as measured at the Eureka Slough bridge.

[13] A vertical datum is a base elevation used to calculate heights or depths. A tidal datum, such as mean sea level, is used as a reference to measure local water levels. Tidal datums are referenced to geodetic datums (e.g., NGVD29 and NAVD88). Geodetic datums are referenced to fixed points, benchmarks, on the earth's surface.

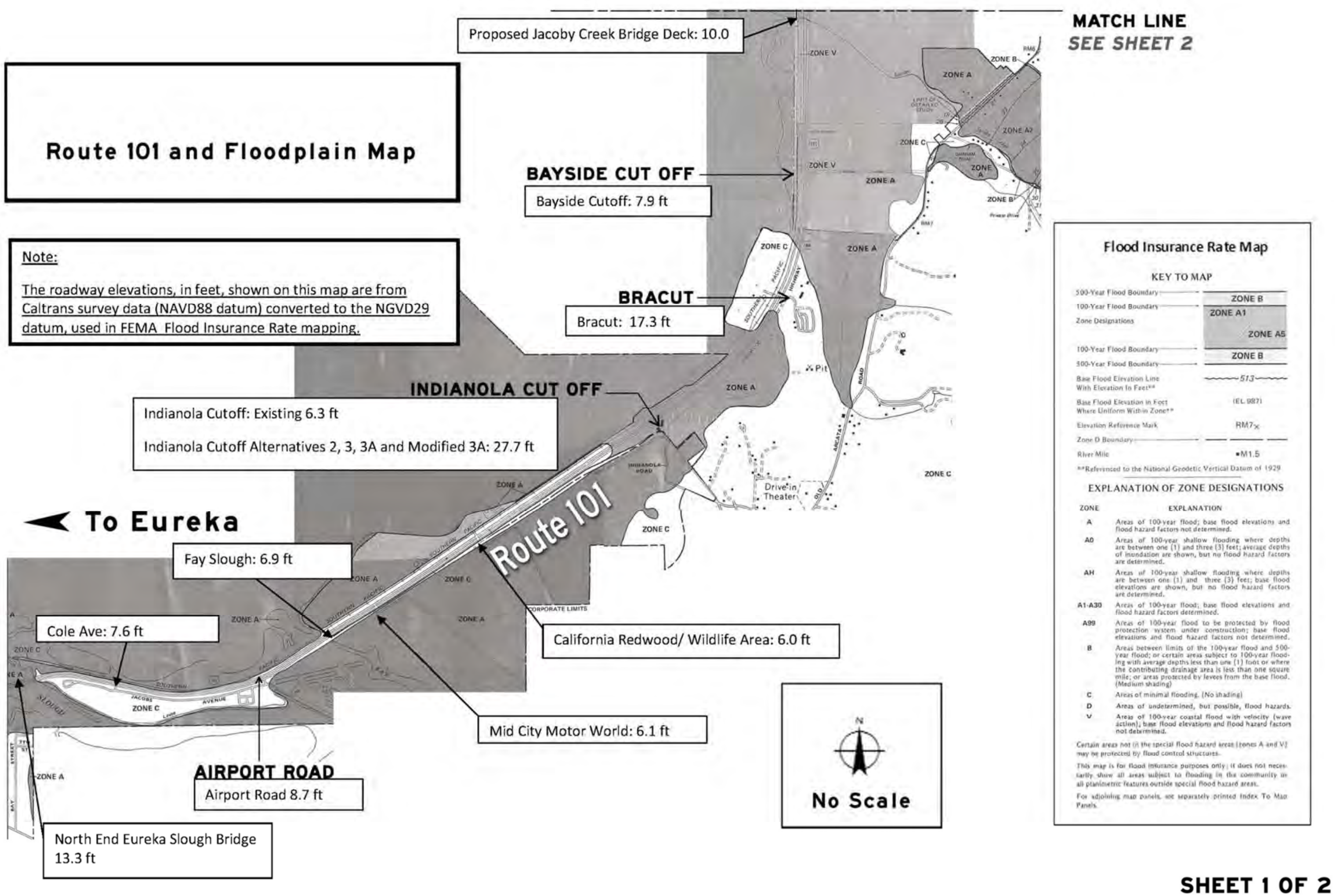

Figure 3-22A Route 101 Floodplain Map

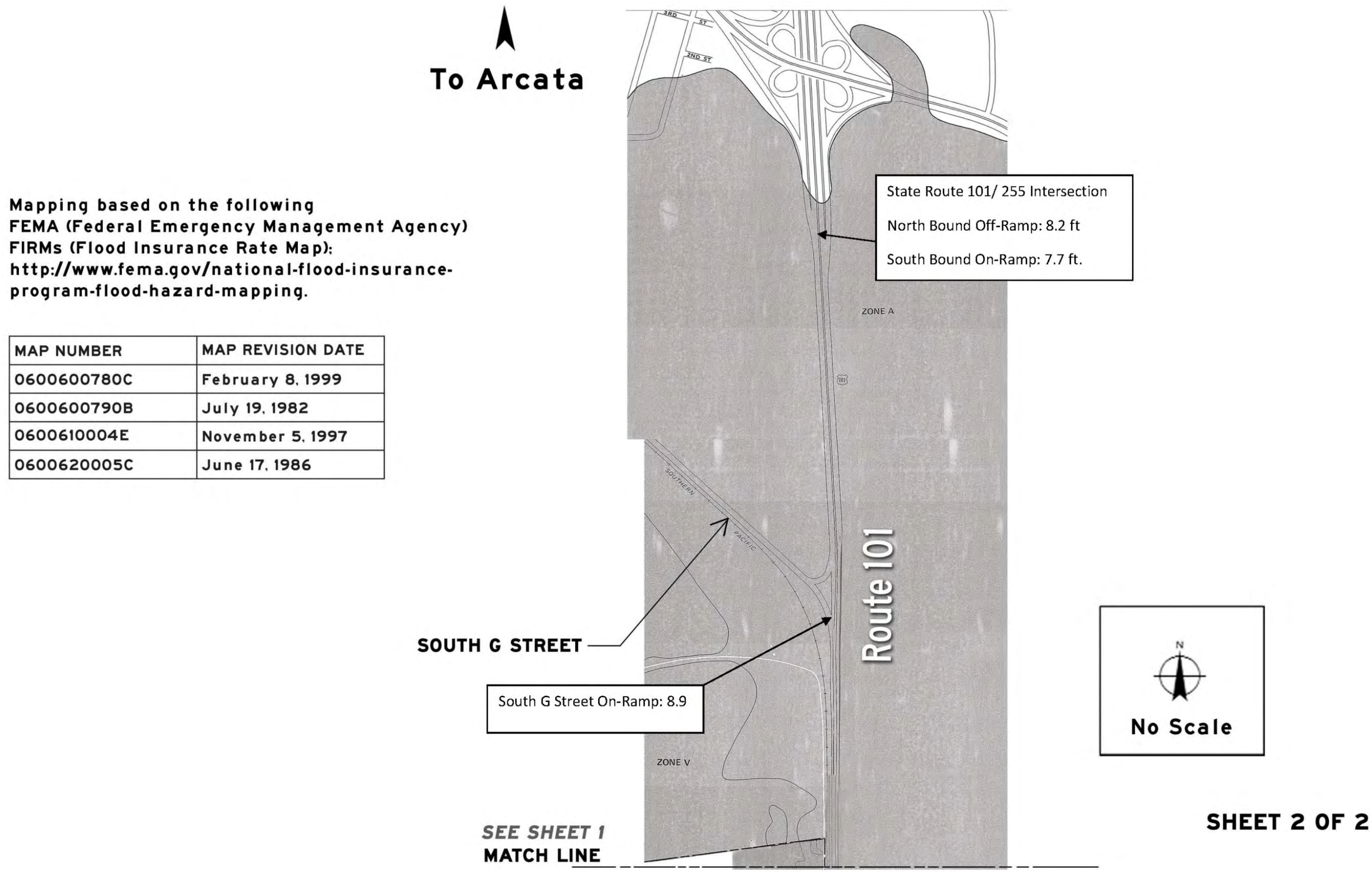

Figure 3-22B Route 101 Floodplain Map

On Route 101, from the Eureka Slough bridge to approximately 1,000 feet south of Indianola Cutoff, and for approximately 300 feet south to 1,100 feet north of the Bracut intersection, Route 101 is outside the 100-year Floodplain, in Zone C. The area adjacent to Jacobs Avenue, protected from the Eureka Slough via a levee, is also mapped as Zone C. The remaining highway and adjacent low-lying areas are designated as Zone A or V.

The California State Reclamation Board defines a designated floodway to mean either: (1) the channel of the stream and that portion of the adjoining floodplain reasonably required to provide passage of a base flood, or (2) the floodway between existing levees as adopted by the California State Reclamation Board or the Legislature. FEMA Floodway Maps for the project study area do not include any designated floodways within the project limits. Jacoby Creek, upstream from Old Arcata Road, is designated as a Floodway. However, downstream of the Old Arcata Road bridge is listed as a Zone V Floodplain. No other floodways near the project have been established.

The floodplain areas for the southern watershed (Freshwater Creek/Eureka Slough) were calculated to be approximately 3,161 acres. The floodplain areas for the northern watershed (Jacoby Creek/Gannon Slough) were calculated to be approximately 916 acres.

Hydrology

Hydrology is the scientific study of the properties, distribution, and circulation of the water of the earth and the atmosphere in all of its forms. Hydrology also includes the study of the amount and flow of groundwater. Understanding the hydrologic setting of the project area is critical to predicting the flooding potential.

The project area is characterized by a cool maritime climate with a seasonal distribution of precipitation. The average annual rainfall for this area is approximately forty-inches. Major floods in the Humboldt Bay area result from a succession of intense winter rainstorms from November to March. The upper watershed consists of mountainous terrain, with slope grades steeper than 1:1 (ratio of horizontal to vertical). There is a high amount of vegetative cover, with minimal development, and the soils generally possess good water permeability properties. A substantial amount of the watershed has been logged in past years.

The lower watershed is less steep with substantial vegetative cover and less water permeable soils than the upper watershed. There is also more development on the lower watershed, but it is much less dense than urban development. Because of high groundwater elevations, and the often-saturated soils, infiltration of runoff is considered low during the winter months.

Hydraulics

The drainage systems within the Route 101 corridor are an intricate arrangement of levees, channels, and sloughs, all under tidal influence. During high tide events, except for Jacoby Creek and Washington Gulch, all tide gates close and runoff entering the Route 101 corridor begins to be stored within the floodplain. Once the tidal elevations recede and the tide gates open, the stored water drains to the bay. This is the daily routine for all drainage that enters the Route 101 corridor. High water elevations are a direct result of precipitation duration and quantities, tidal elevations, and outflow capacity of the existing drainage systems.

During Humboldt Bay high tide events, water elevations on Jacoby Creek and Washington Gulch rise at and near the outlet to the bay. Depending upon the tide elevation and the flow rate of the creeks, the banks can be breached. Once the banks are breached, the surrounding pasturelands are flooded. These floodwaters are contained within the floodplain until they either infiltrate or exit through Old Jacoby Creek or Gannon Slough.

Zone V is a FEMA designation for those areas along coasts that are subject to inundation by the 100-year flood event with additional hazards associated with storm-induced waves. Humboldt Bay is assumed to be sheltered from the influence of offshore storm generated waves, but can be influenced by locally generated wind waves with a wave height of less than 3 feet.

Based on the review of Caltrans historic hydraulics files, there has been only one occurrence when Route 101 was overtopped by floodwaters between Eureka and Arcata; which was during the New Year’s Eve 2005 storm (see Figure 3-23). It appears that flooding of adjacent lands has become less frequent since the 1954-1956 construction presumably because of the installation/upgrade of tide gates and an increased highway grade elevation.

A discussion of Sea Level Rise, effects, and adaptation strategies can be found in Chapter 4.

Figure 3-23 New Year's Eve 2005 Storm

December 31, 2005 photograph of southbound lanes of Route 101 just north of Indianola Cutoff. On the day of this photograph, the peak wind gust was 64 mph, and the weather condition was classified as a violent storm (hurricane force begins at 73 mph). *(Source: NOAA National Weather Service, no date)* The predicted astronomical high tide was 8 feet, but the observed high tide was 10 feet. The flooding occurred due to exceptionally high tide conditions plus wind fetch.

ENVIRONMENTAL CONSEQUENCES

Appendix A, Typical Cross Sections, provides a graphical display of the project on Route 101 with proposed alternatives. None of the proposed drainage work results in a measurable decrease of floodwater storage capacity of the floodplain or the outflow (drainage) efficiency of the floodplain. The minimal loss of permeable surfaces due to the acceleration and deceleration lane improvements is considered negligible. All new roadway facilities would operate under gravity flow and would connect to existing drainage systems. All existing drainage patterns would be perpetuated. For Alternatives 2, 3, and Modified Alternative 3A, the proposed grade separation at Indianola Cutoff would include new drainage facilities to direct on-site runoff.

To calculate the encroachment and possible impacts this project may have on the Floodplain, the areas of proposed fill or roadway were compared to the Federal Emergency Management Agency (FEMA) designated 100-year Floodplain areas.

Alternatives 1A, 3, and Modified Alternative 3A include improvements at the Route 101/Airport Road intersection. This intersection is within FEMA Zone C, which are areas of minimal flood hazard.

Extending the existing southbound acceleration and deceleration lanes would require enlarging the roadway fill embankments at both California Redwood Company (Simpson) and Bracut Industrial Park. At these locations, the embankments would be outside the Zone A Floodplain and consequently are considered to have no impact on drainage patterns or floodplain water surface elevations. The proposed extension of the existing northbound acceleration and deceleration lanes for Mid-City Motor World and Bracut, as well as extending the existing deceleration lane for Cole Avenue, is also outside the Zone A Floodplain. Indianola Cutoff and Bayside Road are the two locations where the acceleration and deceleration lane improvements lie within FEMA designated floodplains.

For Alternative 1, the area of the proposed improvements for the Indianola Cutoff acceleration and deceleration lanes was compared to the area of the southern watershed 100-year floodplain. These improvements would result in an encroachment of 0.8 acre, affecting approximately 0.03 percent of the 100-year floodplain area.

For Alternatives 2, and 3, and Modified Alternative 3A, the proposed Route 101/Indianola Cutoff grade separation would encroach upon 7.5 acres or 0.24 percent of the southern watersheds within the 100-year floodplain. Modified Alternative 3A includes a grade separation at Indianola Cutoff with steeper fill slopes and more narrow median than the grade separation design of Alternatives 2 and 3; consequently Modified Alternative 3A would encroach upon 3.9 acres or 0.12 percent of the southern watersheds within the 100-year floodplain. When compared to the total area available for inundation of floodwaters, all proposed construction scenarios would result in placement of negligible amounts of fill.

The proposed grade separation would not result in an encroachment into the 35-foot wide drainage channel adjacent to Indianola Cutoff.

The area of the proposed improvements for the Bayside Road acceleration and deceleration lanes was compared to the area of the northern watershed 100-year floodplain. These improvements would result in a permanent surface area encroachment of 1.1 acres, affecting approximately 0.04 percent of the 100-year floodplain area.

The proposed replacement of southbound Jacoby Creek bridge is a component in all five Build Alternatives. The new bridge deck is planned to be above the estimated elevation of the highest sea level rise during high tide. All proposed roadway structure work would avoid or minimize adverse impacts upon the base floodplain.

For Alternative 1, construction of the acceleration and deceleration lane improvements, with no grade separation, would require placing up to 50,000 cubic yards of fill. Alternative 1A would require placing approximately 60,000 cubic yards of fill.

For Alternatives 2, 3, and Modified Alternative 3A, construction of a grade separation structure would require substantial amounts of imported earth fill material. For Alternatives 2 and 3, the proposed grade separation at Indianola Cutoff would require placing approximately 400,000 cubic yards of fill. Modified Alternative 3A would require placing approximately 270,000 cubic yards of fill for a steep slope grade separation. Since Alternative 3 would require additional earthwork at the Route 101/Airport Road intersection, 2,615 cubic yards more than Alternative 2 would be required.

For all Build Alternatives, the overall roadway elevation would not change after construction except at new highway structures (bridge and interchange). At the Indianola Cutoff Interchange, with Alternatives 2, 3, 3A and Modified 3A, the roadway elevation would increase to a maximum height of approximately 20 feet covering 0.12 to 0.24 percent of the southern watershed. By FEMA guidance, encroachment in a floodway must be limited so that rises greater than 1 foot in the water surface elevation do not result upstream. Based on this constraint, project elevations, while within Zones A and V (the 100 year floodplain zones), would have less than significant effect on the 100-year flood elevation.

See Chapter 3, Section 3.3.2—Wetlands and other Waters of the United States for more information regarding measures taken to reduce impacts to wetlands. Generally, the wetlands coincide with the floodplain.

All work proposed for any one of the Build Alternatives would result in negligible amounts of encroachment into available floodplain areas and all proposed drainage improvements were found to have no decrease in capacity. Therefore, all currently proposed work would not have a substantial effect on the 100-year floodplain and there would be no increase in flooding risks because of the project. There would be no change to the southern and northern watersheds’ capacity to moderate flood events.

The No-Build Alternative, Alternative 7, would not involve any new construction or additional encroachment on the 100-year floodplain.

Impacts to Floodplain Values

Pursuant to Executive Order 11988, a Federal project in floodplains shall be avoided unless it is the only practicable alternative based on the following:

1. ***The practicability of alternatives to any longitudinal encroachment*s**. Most of the existing Route 101 roadway and bridges within the project limits are either adjacent to, or within the 100-year floodplain. Any improvements to this facility to avoid floodplain encroachment would not be feasible.

2. ***Project risks.*** A number of structures are located in the existing 100-year floodplains of Eureka Slough, Freshwater Slough, Fay Slough, Jacoby Creek and Gannon Slough and within one mile of Route 101. Structures within the floodplain include agricultural buildings, homes and some commercial buildings. Any one of the Build Alternatives would have a less than substantial effect to the 100-year floodplain and consequently would not increase the potential for flooding risk for any of the structures. Minor widening of the highway fill slopes would comprise a very small portion of the existing floodplain.

3. ***Impacts on and measures to minimize and to preserve/restore natural and beneficial floodplain values.*** The natural and beneficial floodplain values within the project area include wetlands, fish, wildlife, plants, open space, natural beauty, scientific study, outdoor recreation, pastureland, natural moderation of floods, and water quality maintenance. Impacts and mitigation for these values, except for the natural moderation of floods considered above, are discussed in detail in the Human Environment, Visual, Water Quality, and Biological Environment sections in this chapter.

4. ***Support of incompatible floodplain development.*** None of the Build Alternatives would directly support, allow, serve or otherwise facilitate incompatible base floodplain development. See Chapter 3, Section 3.1.1.–Community Impacts for more information.

AVOIDANCE, MINIMIZATION, AND/OR MITIGATION MEASURES

Since there are no anticipated temporary or permanent adverse floodplain impacts, mitigation is not necessary. However, measures to restore and preserve the natural and beneficial floodplain values in terms of water quality and wetlands are discussed in sections 3.2.2 and 3.3.2.

3.2.2 Water Quality and Stormwater Runoff

REGULATORY SETTING

Federal Requirements: Clean Water Act

In 1972 Congress amended the Federal Water Pollution Control Act, making the addition of pollutants to the waters of the United States (U.S.), from any point source unlawful unless the discharge is in compliance with a National Pollutant Discharge Elimination System (NPDES) permit. Known today as the Clean Water Act (CWA), Congress has amended it several times. In the 1987 amendments, Congress directed dischargers of stormwater from municipal and industrial/construction point sources to comply with the NPDES permit scheme.

Important CWA sections are:

- Sections 303 and 304 require states to promulgate water quality standards, criteria, and guidelines.
- Section 401 requires an applicant for a federal license or permit who wishes to conduct any activity which may result in a discharge to Waters of the U.S., to obtain certification from the State that the discharge will comply with other provisions of the act. (Most frequently required in tandem with a Section 404 permit request. See below.)
- Section 402 establishes the NPDES, a permitting system for the discharges (except for dredge or fill material) of any pollutant into Waters of the U.S. Regional Water Quality Control Boards (RWQCB) administer this permitting program in California. Section 402(p) requires permits for discharges of stormwater from industrial/construction and municipal separate storm sewer systems (MS4s).
- Section 404 establishes a permit program for the discharge of dredge or fill material into Waters of the U.S. This permit program is administered by the U.S. Army Corps of Engineers (USACE).

The objective of the CWA is "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters."

USACE issues two types of 404 permits: Standard and General Permits. There are two types of General permits: Regional permits and Nationwide permits. Regional permits are issued for a general category of activities when they are similar in nature and cause minimal environmental effect. Nationwide permits are issued to authorize a variety of minor project activities with no more than minimal effects.

Ordinarily, projects that do not meet the criteria for a Regional or Nationwide Permit may be permitted under one of the USACE's Standard permits. There are two types of Standard permits: Individual permits and Letters of Permission. For Standard permits, the USACE's decision to approve is based on compliance with U.S. Environmental Protection Agency's (USEPA) Section 404 (b)(1) Guidelines (USEPA Code of Federal Regulations [CFR] 40 Part 230), and whether the permit approval is in the public interest. The Section 404(b)(1) Guidelines (Guidelines) were developed by the USEPA in conjunction with the USACE, and allow the discharge of dredged or fill material into the aquatic system (Waters of the U.S.) only if there is no practicable alternative which would have less adverse effects. The Guidelines state that the USACE may not issue a permit if there is a least environmentally damaging practicable alternative (LEDPA) to the proposed discharge that would have lesser effects on Waters of the U.S. and not have any other significant adverse environmental consequences. According to the Guidelines, documentation is needed that a sequence of avoidance, minimization, and compensation measures has been followed, in that order. The Guidelines also restrict permitting activities that violate water quality or toxic effluent[14] standards, jeopardize the continued existence of listed species, violate marine sanctuary protections, or cause "significant degradation" to Waters of the U.S. In addition, every permit from the USACE, even if not subject to the Section 404(b)(1) Guidelines, must meet general requirements. See 33 CFR 320.4. A discussion of the LEDPA determination for this project is included in the Wetlands and Other Waters section in this chapter and Appendix E – NEPA/404 Integration Process.

State Requirements: Porter-Cologne Water Quality Control Act

California's Porter-Cologne Act, enacted in 1969, provides the legal basis for water quality regulation within California. This Act requires a "Report of Waste Discharge" for any discharge of waste (liquid, solid, or gaseous) to land or surface waters that may impair beneficial uses for surface and/or groundwater of the State. It predates the CWA and regulates discharges to Waters of the State. Waters of the State include more than just Waters of the U.S., but also groundwater and surface waters not considered Waters of the U.S. Additionally, it prohibits discharges of "waste" as defined—and this definition is broader than the CWA definition of "pollutant". Discharges under the Porter-Cologne Act are permitted by Waste Discharge Requirements (WDRs) and a permit may be required even when the discharge is already permitted or exempt under the CWA.

The State Water Resources Control Board (SWRCB) and RWQCBs are responsible for establishing the water quality standards (objectives and beneficial uses) required by the CWA, and regulating discharges to ensure compliance with water quality standards. Details regarding water quality standards in a project area are contained in the applicable RWQCB Basin Plan. States designate beneficial uses for all water body segments, and then set criteria necessary to protect these uses. Consequently, the water quality standards developed for particular water segments are based on the designated use and vary depending on such use. In addition, each state identifies waters failing to meet standards for specific pollutants, which are then state-listed in accordance with CWA Section 303(d). If a state determines that waters are impaired for one or more constituents and the standards cannot be met through point source controls, the CWA requires the establishment of Total Maximum Daily Loads (TMDLs). TMDLs specify allowable pollutant loads from all sources (point, non-point, and natural) for a given watershed.

State Water Resources Control Board and Regional Water Quality Control Boards

The State Water Resources Control Board (SWRCB) administers water rights, water pollution control, and water quality functions throughout the state. Regional Water Quality Control Boards (RWCQBs) are responsible for protecting beneficial uses of water resources within their regional jurisdiction using planning, permitting, and enforcement authorities to meet this responsibility.

[14] The USEPA defines "effluent" as "wastewater, treated or untreated, that flows out of a treatment plant, sewer, or industrial outfall."

Municipal Separate Storm Sewer Systems

Section 402(p) of the CWA requires the issuance of NPDES permits for five categories of stormwater dischargers, including Municipal Separate Storm Sewer Systems (MS4s). The USEPA defines an MS4 as any conveyance or system of conveyances (roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, human-made channels, and storm drains) owned or operated by a state, city, town, county, or other public body having jurisdiction over stormwater, that are designed or used for collecting or conveying stormwater. The SWRCB has identified Caltrans as an owner/operator of an MS4. This permit covers all Department rights-of-way, properties, facilities, and activities in the state. The SWRCB or the RWQCB issues NPDES permits for five years, and permit requirements remain active until a new permit has been adopted.

The Caltrans MS4 Permit (Order No, 2012-0011-DWQ) was adopted on September 19, 2012 and became effective on July 1. The permit has three basic requirements:

1. Caltrans must comply with the requirements of the Construction General Permit (see below);
2. Caltrans must implement a year-round program in all parts of the State to effectively control stormwater and non-stormwater discharges; and
3. Caltrans stormwater discharges must meet water quality standards through implementation of permanent and temporary (construction) Best Management Practices (BMPs), to the Maximum Extent Practicable, and other measures as the SWRCB determines to be necessary to meet water quality standards.

To comply with the permit, Caltrans developed the Statewide Storm Water Management Plan (SWMP) to address stormwater pollution controls related to highway planning, design, construction, and maintenance activities throughout California. The SWMP assigns responsibilities within Caltrans for implementing stormwater management procedures and practices as well as training, public education and participation, monitoring and research, program evaluation, and reporting activities. The SWMP describes the minimum procedures and practices Caltrans uses to reduce pollutants in stormwater and non-stormwater discharges. It outlines procedures and responsibilities for protecting water quality, including the selection and implementation of BMPs. The proposed project would be programmed to follow the guidelines and procedures outlined in the latest SWMP to address stormwater runoff.

Part of and appended to the SWMP is the StormWater Data Report (SWDR) and its associated checklists. The SWDR documents the relevant stormwater design decisions made regarding project compliance with the MS4 NPDES permit. The preliminary information in the SWDR, prepared during the Project Initiation Document (PID) phase, would be reviewed, updated, confirmed, and if required, revised in the SWDR prepared for the later phases of the project.

The information contained in the SWDR may be used to make more informed decisions regarding the selection of BMPs and/or recommended avoidance, minimization, or mitigation measures to address water quality impacts.

Construction General Permit

Construction General Permit (Order No. 2009-009-DWQ), adopted on September 2, 2009, became effective on July 1, 2010. The permit regulates stormwater discharges from construction sites which result in a Disturbed Soil Area (DSA) of one acre or greater, and/or are smaller sites that are part of a larger common plan of development. By law, all stormwater discharges associated with construction activity where clearing, grading, and excavation results in soil disturbance of at least one acre must comply with the provisions of the General Construction Permit. Construction activity that results in soil disturbances of less than one acre is subject to this Construction General Permit if there is potential for significant water quality impairment resulting from the activity as determined by the RWQCB. Operators of regulated construction sites are required to develop stormwater pollution prevention plans; to implement sediment, erosion, and pollution prevention control measures; and to obtain coverage under the Construction General Permit.

The 2009 Construction General Permit separates projects into Risk Levels 1, 2, or 3. Risk levels are determined during the planning and design phases, and are based on potential erosion and transport to receiving waters. Requirements apply according to the Risk Level determined. For example, a Risk Level 3 (highest risk) project would require compulsory stormwater runoff pH and turbidity monitoring, and before construction and after construction aquatic biological assessments during specified seasonal windows for all projects that have DSA greater than 35 acres. For all projects subject to the permit, applicants are required to develop and implement an effective Storm Water Pollution Prevention Plan (SWPPP). In accordance with Caltrans Standard Specifications, a Water Pollution Control Plan (WPCP) is necessary for projects with DSA less than one acre.

Section 401 Permitting

Under Section 401 of the CWA, any project requiring a federal license or permit that may result in a discharge to a water body must obtain a 401 Certification, which certifies that the project will be in compliance with State water quality standards. The most common federal permits triggering 401 Certification are CWA Section 404 permits issued by USACE. The 401 permit certifications are obtained from the appropriate RWQCB, dependent on the project location, and are required before USACE issues a 404 permit.

In some cases, the RWQCB may have specific concerns with discharges associated with a project. As a result, the RWQCB may issue a set of requirements, known as Waste Discharge Requirements (WDRs), under the State Water Code that define activities such as the inclusion of specific features, effluent limitations, monitoring, and plan submittals that are to be implemented for protecting or benefiting water quality. WDRs can be issued to address both permanent and temporary discharges of a project.

The Humboldt County General Plan addresses water quality in Section 3330. Section 3360 includes the following goal statement:

> To maintain or enhance the quality of the county's water resources and the fish and wildlife habitat utilizing those resources.

Section 3361 includes the following policies:

1. Ensure that land use decisions are consistent with the long term value of water resources in Humboldt County.
2. Regulate development that would pollute watershed areas.

Section 3362 includes the following standard:

> Development which could potentially 'pollute a watershed area' includes, but is not limited to the placement of septic systems, junkyards, waste disposal facilities, industries using toxic chemicals, and other potentially polluting substances proximate to streams, creeks, reservoirs, or groundwater basins. It can also occur from additions of natural material into a stream because of land use practices but does not include normal agricultural practices which do not require permits from the County.

AFFECTED ENVIRONMENT

The Eureka-Arcata Route 101 Corridor Improvement Project is located in a region subject to cool maritime climate with a seasonal distribution of precipitation. The average annual rainfall for this area is approximately 40 inches. The upper watershed of the project area consists of mostly mountainous terrain. There is a high proportion of vegetative cover, with minimal development and permeable soil. The lower watershed adjacent to Route 101 is mostly flat, with development clusters, good vegetative cover, and less permeable soils. Current land uses in the majority of the project vicinity are rangeland; wildlife refuges; sporadic agriculture structures, residences, and businesses. A separate project Floodplain Report was prepared for the project and provides additional information on the regional hydrology. See the previous section in this chapter for more floodplain information.

The Eureka-Arcata Route 101 Corridor Improvement Project extends along the coast of Arcata Bay, which is a part of Humboldt Bay. Sheet flow is the predominate stormwater flow pattern from Route 101 roadway surfaces to vegetated roadway slopes. The entire project is located in the Humboldt/Arcata Bay watershed. A watershed is the area of land where all of the water that is under it or drains off of it goes into the same place. Watercourses within the Arcata Bay watershed and adjacent to the Route 101 project area include Gannon Slough; Jacoby Creek; Old Jacoby Creek; Brainard's Slough (which Rocky Gulch and Washington Gulch flow into); Fay Slough; Eureka Slough/Freshwater Creek; an unnamed drainage channel parallel and to the east of Route 101 (herein referred to as the Route 101 slough); an unnamed drainage channel parallel and between the railroad and Route 101; and an unnamed ditch between Route 101 and Jacobs Avenue. See the plan sheets in Appendix A for the location of these watercourses.

The project is located in the Eureka Plain Hydrologic Unit according to the North Coast Region Basin Plan, prepared by the North Coast Regional Water Quality Control Board. Existing Beneficial Uses identified in the plan for Jacoby Creek and Freshwater Creek are Municipal and Domestic Supply; Agricultural Supply; Industrial Service Supply; Groundwater Recharge; Freshwater Replenishment; Navigational; Water Contact Recreation; Non-Contact Water Recreation; Commercial and Sport Fishing; Cold Freshwater Habitat; Wildlife Habitat; Rare, Threatened, or Endangered Species; Marine Habitat; Migration or Aquatic Organisms Spawning, Reproduction, and/or Early Development; Estuary Habitat; Agriculture; and Native American Culture. Existing Beneficial uses listed for Humboldt Bay are Municipal and Domestic Supply; Agricultural Supply; Industrial Service Supply; Freshwater Replenishment; Navigational; Water Contact Recreation; Non-Contact Water Recreation; Commercial and Sport Fishing; Cold Freshwater Habitat; Wildlife Habitat; Rare, Threatened, or Endangered Species; Marine Habitat; Migration or Aquatic Organisms Spawning, Reproduction, and/or Early Development; Shellfish Harvesting; Estuary Habitat; Agriculture; and Native American Culture.

The Eureka Plain Hydrologic Unit, Freshwater Creek is listed in the 2006 CWA Section 303(d) List of Water Quality Limited Segments Requiring TMDLS[15] as impaired for Sedimentation/Siltation. Humboldt Bay is listed as impaired for dioxin toxic equivalents and PCBs (polychlorinated biphenyls). Jacoby Creek watershed is listed as impaired for sediment. The proposed TMDL completion dates are listed as 2019.

ENVIRONMENTAL CONSEQUENCES

The discussion in the first part of this section includes the estimated area of disturbed ground exposed temporarily during construction and the net increase in area of paved surface after construction for any one of the Build Alternatives. Any area of disturbed ground is a potential source of sediment that can be transported from the disturbed ground area to a watercourse. An excess of sediment transported to watercourses can be detrimental to the beneficial uses described in the previous subsection.

[15] Total maximum daily loads are established once a water body is identified as impaired under Section 303(d) of the Clean Water Act.

The area of disturbed ground, or exposed earth, provides a broad indication of the potential for stormwater runoff and erosion potential. The increase in paved area reflects the potential permanent decrease in ground percolation of stormwater, which results in additional stormwater run-off. An increase in run-off is also a potential concern to beneficial uses if not avoided or minimized. See Tables 3-14 and 3-15 for totals of disturbed soil area and paved areas.

Table 3-14 Anticipated Disturbed Soil Area Within the Project Limits During Project Construction

	Alternative				
	1	1A	2	3	Modified 3A
Totals (Acres)	22	26	37	43	37

Table 3-15 Change in Paved Surface Areas Within the Project Limits Post Project Construction

	Alternative				
	1	1A	2	3	Modified 3A
Existing (Acres)	71.19	71.19	71.19	71.19	71.19
Proposed Change (Acres)	0.28	3.41	4.18	5.98	4.12
Total Proposed Impervious Surface	71.47	74.60	75.37	77.17	75.31
Total Proposed Impervious Percent Increase	0.4%	4.8%	5.9%	8.4%	5.8%

(Source: Caltrans Memorandum, 2015)

Potential Adverse Water Quality Effects

Based on the amount of disturbed soil area and the increase of impervious surface[7], any one of the Build Alternatives could potentially result in adverse impacts to water quality if project construction activities are not properly managed. However, the predominant sheet flow (or surface run-off) drainage patterns and abundance of vegetated slopes and swales (broad, shallow channel), combined with a climate to sustain vegetation, would provide a natural sediment filtration treatment for almost all of the stormwater runoff.

[7] Impervious surface: A hard surface area that either prevents or retards the entry of water into soil as under natural conditions prior to development and/or a hard surface area that causes water to run off the surface in greater quantities or at an increased rate of flow from the flow present under natural conditions prior to development.

The primary constituent of concern for any one of the Build Alternatives is sediment transported to adjacent watercourses both during and after construction. During construction, there could be temporary adverse effects from increased erosion that may eventually transport sediment into storm drains and adjacent watercourses. After construction, newly vegetated cut and fill slopes have the potential for sediment transport if not inspected and maintained against developing erosion potential.

There is also a slight potential for spills and leaks of lubricant, oil, and grease and other fluids associated with vehicles and equipment during construction. Fueling or maintenance of construction vehicles could occur in the project area during construction and there could be a slight risk of accidental spills or releases of fuels, oils, or other potentially hazardous materials.

Short Term Effects

Short term impacts are those that occur during the construction period and until the project is considered stabilized and complete according to the Construction General Permit. Construction projects are considered stabilized when the site will not pose any additional sediment discharge risk than it did prior to the commencement of construction activity. Any one of the Build Alternatives has the potential to cause water quality impairments through soil disturbance and the highway construction process. The following construction activities have the potential to contribute to increases in sediment, turbidity, floating materials, oil, grease, and chemicals to receiving waters:

- ***Prefabricated Vertical Drains (PVDs)***, or wick drains, would need to be installed during the construction of the interchange at Indianola Cutoff. PVDs provide a preferential path (a shorter path with less resistance) for water to vertically move from compressed water saturated soil layers to more permeable (porous) layers. Little water, if any, would rise to the surface; any water that does surface would be collected and properly processed/disposed. Water would only move through the PVDs during the six months the soil is being compacted by the fill; after approximately six months the settlement would reach a point of equilibrium and only negligible settling and vertical water movement would occur thereafter.

- ***Daily contractor activity***. Routine construction activities such as material delivery, storage and usage, waste management, vehicle/equipment operation, cleaning, maintenance and fueling, and use of a construction staging area could result in generation of dust, sediment, debris, chemicals and garbage. Vehicle/Equipment fueling and maintenance during construction has the potential for accidental spills of gasoline, diesel, oil, grease, hydraulic fluids, and other fluids into the environment.

- ***Vegetation clearing and grubbing.*** Removal or trimming of vegetation would be required for both construction and access. This activity would eliminate the groundcover that protects the topsoil. Exposed topsoil is more susceptible to erosion.

- ***Earthwork.*** Earthwork includes removal of the natural and/or stabilizing cover (topsoil), grading cut and fill slopes, and creating material stockpiles. Prior to establishment of temporary or permanent erosion control measures, earth stockpiles are highly susceptible to erosion.

- ***Bridge Demolition and Construction activities.*** These activities would include the placement of fill and paving within the median for a temporary detour at Jacoby Creek, the excavation on the banks of Jacoby Creek, pile placement through vibratory or rotary/oscillation methods for the construction of foundations, the placement of precast-prestressed box section bridge components, or foundation supported false work to construct a cast-in-place single span bridge. Temporary cofferdams and dewatering (pumping/draining water) may be required for foundation excavations where pumped water would be contained within the median. Removal of a bridge structure over water would also be required. In-water activities in general have the potential for suspending sediment and increasing turbidity levels. Operation of equipment and personnel for the removal and placement of concrete over the water has the potential for spillage of fluids and construction materials.

- ***Dewatering.*** Dewatering may be necessary and would be required to meet effluent limits of a Waste Discharge Requirements (WDR) permit that may be issued by the NCRWQCB. Any construction dewatering operations would be required to meet effluent limits established by the NCRWQCB to maintain the beneficial uses identified in the North Coast Basin Plan.

- ***Culvert extensions and tide gate replacement.*** Work on culverts and tide gates would require in-water activities that have the potential for suspending sediment and increasing turbidity levels. Operation of equipment adjacent to the water has the potential for spillage of fluids and construction materials.

- ***Paving activities.*** Paving operations involve the handling of asphalt products that if not properly managed could enter stormwater runoff and/or receiving waters.

- ***Use and storage of fluids and chemicals.*** Accidental spills, improper storage, and improper application of chemicals during construction, such as fertilizers and concrete, could potentially impact water quality. Improper storage of oils and fuels could result in accidental spills and/or leaks within the construction area.

Long-Term (Post Project Construction) Effects

The potential for long-term impacts on water quality include:

- ***Hydromodification Analysis*[16]*.*** Increases in impervious areas typically cause an increase in the peak channel flow and higher stormwater runoff volumes that could lead to channel scouring and bank erosion. The result could increase sediment and turbidity in receiving waters. Due to the area's flat terrain and predominate sheet flow drainage patterns onto vegetated slopes, the 7 percent increase in impervious surface created by the project would not likely create channel scouring or bank failures. The project area receiving water bodies are tidal influenced and therefore would not be impacted from hydromodification; thus, a hydromodification analysis or mitigation for hydromodification would not be required for this project (confirmed with NCRWQCB staff members Mona Dougherty and Jeremiah Puget in a meeting with Caltrans staff on January 28, 2010).

- ***Concentration of runoff.*** Typical highway drainage design involves collecting runoff in pipes or ditches, and discharging, either directly or indirectly, into receiving waters; however, drainage patterns of this project site are predominately sheet flow with stormwater runoff discharging to the same drainages as pre-project conditions.

- ***Highway runoff.*** Contaminants generated by traffic, pavement materials, and airborne particles that settle may be carried by stormwater runoff into receiving waters; however, there should be no increase in the pollutant loading over the existing condition as this project is not intended to generate an increase in traffic volume. The existing vegetated slopes that provide biofiltration[16] treatment of stormwater runoff would be perpetuated. The area climate, soils and slopes provide near ideal conditions to sustain dense vegetation growth for biofiltration treatment BMPs. The remaining vegetated slopes and new vegetated slopes after construction would still perform adequate biofiltration for stormwater runoff. By realignment of the roadway and removing existing paved median crossings, any one of the five Build Alternatives would result in a net increase in biofiltration treatment BMPs by creating new biofiltration BMPs in the vicinity of the Indianola grade separation. The proposed project is not likely to degrade water quality from the pre-project condition.

- ***Accidental spills.*** Spills caused by highway-related traffic accidents have the ability to cause significant impacts to water quality, depending on the type and quantity of the material spilled. The Build Alternatives would improve traffic safety, thereby reducing the potential for accidents and spills.

[16] Biofiltration is a pollution control technique using living material to capture and biologically degrade process pollutants. Examples of biofiltration include bioswales and biostrips.

None of the project alternatives would increase traffic-carrying capacity because the project is not adding additional traffic carrying supply, or travel lanes, to the overall system. The proposed grade separation would improve the intersection level of service, but Indianola Cutoff would remain a two-lane road with the same traffic carrying capacity. Since this project does not add capacity, no increase to traffic related pollutant runoff is anticipated from this project.

Alternative 7 - No-Build

The potential for spills from traffic collisions within the Eureka-Arcata corridor would remain unchanged, as long as the roadway and traffic conditions remain stable. As necessary, the project area would likely require other smaller projects to maintain or rehabilitate the road surfaces, drainage systems, bridge structures or smaller safety projects. Smaller projects programmed over a longer time frame, combined with more required maintenance activities, have the potential for water quality impacts.

AVOIDANCE, MINIMIZATION, AND/OR MITIGATION MEASURES

Short Term Minimization and Avoidance Measures

The potential short term impacts during construction, such as sediment transport from exposed areas and potential for non-stormwater releases, would be avoided or minimized through implementation measures contained in the Caltrans construction standard specifications, construction contract special provisions, public resource agency permit requirements, and the Storm Water Pollution Prevention Plan (SWPPP). Construction-related impacts are addressed in the SWPPP prepared by the contractor as required by contract specifications and the Construction General Permit. A project specific SWPPP (with Water Pollution Control Drawings showing locations and scheduling of Best Management Practice [17] (BMP) installations) prepared by the construction contractor and approved by the Caltrans Resident Engineer would be available for review.

Temporary Construction BMPs include Soil Stabilization (SS), Sediment Control (SC), Wind Erosion Control (WE), Tracking Control (TC), Non-Stormwater Management (NS), and Waste Management (WM).

[17] The term "Best Management Practice," or BMP, originated in the Clean Water Act of 1972, and is now commonly used in the language of environmental management. The USEPA, the agency in charge of administering the Clean Water Act, provides the following definition of stormwater management BMP: A BMP is a technique, process, activity, or structure used to reduce the pollutant content of a stormwater discharge. BMPs include simple nonstructural methods, such as good housekeeping and preventive maintenance. BMPs may also include structural modifications, such as the installation of bioretention measures. BMPs are most effective when used in combination with each other, and customized to meet the specific needs (drainage, materials, activities, etc.) of a given operation. The focus of EPA's general permits is on preventive BMPs, which limit the release of pollutants into stormwater discharges. BMPs can also function as treatment controls.

Detailed BMP installation requirements and specifications are described in the Construction Site Best Management Practices Manual and can be viewed at http://www.dot.ca.gov/hq/construc/stormwater/CSBMPM_303_Final.pdf

Temporary Construction BMPs applicable to each construction activity are:

- SS-1 Scheduling
- WE-1 Wind Erosion Control
- NS-1 Water Conservation Practices
- NS-6 Illicit Connection/Illegal Discharge Detection and Reporting
- NS-8 Vehicle and Equipment Cleaning
- NS-9 Vehicle and Equipment Fueling
- NS-10 Vehicle and Equipment Maintenance
- WM-1 Material Delivery and Storage
- WM-2 Material Usage
- WM-3 Stockpile Management
- WM-4 Spill Prevention and Control
- WM-5 Solid Waste Management
- WM-9 Sanitary/Septic Waste Management
- 8.1.2 Materials Pollution Control BMPs

Vegetation clearing and grubbing, earthwork. The following BMPs are often deployed during construction in combinations such as straw mulch for as a source control, fiber rolls as a linear barrier, and check dams for sediment control.

- SS-2 Preservation of Existing Vegetation
- SS-3 Hydraulic Mulch
- SS-5 Soil Binders
- SS-6 Straw Mulch
- SS-7 Geotextiles, Plastic Covers, Erosion Control Blankets/Mats
- SS-8 Wood Mulch
- SS-9 Earth Dikes/Drainage Swales & Lined Ditches
- SS-10 Outlet Protection/Velocity Dissipation Devices
- SS-11 Slope Drains
- SS-12 Stream Bank Stabilization
- SC-1 Silt Fence
- SC-2 Sediment/De-silting Basin
- SC-3 Sediment Trap
- SC-4 Check Dam
- SC-5 Fiber Rolls
- SC-6 Gravel Bag Berm

- SC-7 Street Sweeping and Vacuuming
- SC-8 Sandbag Barrier
- SC-9 Straw Bale Barrier
- SC-10 Storm Drain Inlet Protection
- TC-l Stabilized Construction Entrance/Exit
- WM-7 Contaminated Soil Management

The following BMPs would be required, if appropriate, during bridge construction, demolition activities, culvert extensions, and tide gate replacement work:

- SC-1 Silt Fence
- SS-12 Stream Bank Stabilization
- NS-2 Dewatering Operations (WDR Permit will be required)
- NS-4 Temporary Stream Crossing
- NS-11 Pile Driving Operations
- NS-12 Concrete Curing
- NS-13 Material and Equipment Use Over Water
- NS-14 Concrete Finishing
- NS-15 Structure Demolition/Removal Over or Adjacent to Water
- WM-6 Hazardous Waste Management
- WM-8 Concrete Waste Management
- WM-10 Liquid Waste Management
- NS-5 Clear Water Diversion (tide gate replacement work only)

Paving activities:

- SC-7 Street Sweeping and Vacuuming
- NS-3 Paving and Grinding Operations
- TC-l Stabilized Construction Entrance/Exit

Long Term Minimization and Avoidance Measures

As stated previously, any one of the Build Alternatives could potentially result in adverse impacts to water quality resulting from an increase in impervious areas following project construction. The net increase in impervious surface (compared to the No-Build Alternative or existing condition) ranges from 6 to 12 percent, depending on the alternative.

After construction, stormwater conveyance systems and permanent erosion control measures would be maintained in compliance with the Caltrans Storm Water Management Plan (SWMP). To minimize the potential adverse impacts from sediment transport, permanent BMPs (such as biofiltration strips and swales) would be installed to the maximum extent practicable in accordance to Caltrans SWMP design criteria. The area climate, soils and slopes provide near-ideal conditions for dense vegetation growth biofiltration treatment (a type of permanent BMP). In addition, selected temporary construction BMPs would remain in place for additional soil stabilization and sediment control measures.

Implementation of the following permanent BMPs applicable to this project would be designed to mitigate impacts to water quality from stormwater runoff to non-adverse levels:

- Cut and fill slopes would receive a hydroseed application formulated by a licensed Landscape Architect to provide final stabilization.
- Use of asphalt dikes and overside drains would be kept to a minimum to maintain stormwater sheet flow drainage patterns.
- Drainage conveyance systems would be designed with consideration of downstream effects.
- Use of a retaining wall structure to minimize impacts to adjacent wetlands and existing drainage patterns at Jacobs Avenue (Modified Alternative 3A) or at the Route 101 Slough north of the California Redwood Company on the east side of Route 101 (Alternative 1A).
- Sheet flow stormwater runoff drainage patterns over vegetated fill slopes and swales would be maximized for biofiltration treatment.
- Plant native or site-appropriate vegetation.

The project would be designed and constructed in conformance with the following regulations:

- The Clean Water Act (CWA) of 1972, the major federal legislation governing water quality.
- The Porter-Cologne Water Quality Act, the basis for water quality regulation in California.
- The Caltrans Statewide NPDES Permit, Order No. 2012-011-DWQ, covering all Caltrans facilities in the State. In compliance with this permit, Caltrans developed the SWMP to address stormwater pollution controls related to highway planning, design, construction, and maintenance activities throughout the state.
- Construction General Permit, Order 2009-009-DWQ.

With these regulatory control measures and implementation of BMPs, this project would not adversely impact water quality.

3.2.3 Geology, Soils, Seismic, Topography

REGULATORY SETTING

For topographic and geologic features, the key federal law is the Historic Sites Act of 1935, which establishes a national registry of natural landmarks and protects "outstanding examples of major geological features." Topographic and geologic features are protected under the California Environmental Quality Act.

This section also discusses geology, soils, and seismic concerns as they relate to public safety and project design. Earthquakes are prime considerations in the design and retrofit of structures. The Caltrans Office of Earthquake Engineering is responsible for assessing the seismic hazard for Caltrans projects. The current policy is to use the anticipated Maximum Credible Earthquake (MCE) from young faults in and near California. The MCE is defined as the largest earthquake that can be expected to occur on a fault over a particular period of time.

AFFECTED ENVIRONMENT

The majority of the project is located along the east side of the North Coast Railroad Authority track embankment which, in turn, extends along the easterly shoreline of Arcata Bay. The lowlands are protected from tidal inundation by dikes, floodgates, and the embankments of the railroad and present highway. A drainage channel extends parallel and east of the highway. The northbound (NB) and southbound (SB) lanes were built on separate embankments constructed approximately 30 years apart. The existing SB embankment was constructed in 1918 and surfaced in the 1920's to provide one travel lane for each direction. At that time, a drainage channel was located adjacent to and east of the existing SB embankment. A second roadway embankment was constructed in the 1950's to provide two additional lanes. The drainage channel was moved eastward to its present location, adjacent to and east of the NB embankment. The location of the original drainage channel now serves as the median area between the NB and SB roadway embankments.

In the vicinity of the Route 101 median at Bracut, there was a knoll now known as Brainard Cut. The knoll was completely flattened during the 1950's for the construction of the NB lanes. Its material, thought to consist of non-marine sand and sandstone, was used to construct the NB embankments. Construction records indicate that native earth material unsuitable to support a roadway was excavated to a depth of approximately four-feet from beneath the NB embankment footprint prior to its construction to minimize settlement and increase the embankment stability. The unsuitable material was used as fill material for the channel and median, and to flatten the outside embankment slopes.

The length of the project construction limits, except in the vicinity of Bracut, consists mostly of unconsolidated, coarse-to-fine-grained sand and silt (alluvium) typically found on coastal plains, valley bottoms and along river flood plains. During earthquakes of sufficient magnitude and duration, this material exhibits potential for liquefaction. Liquefaction is the sudden loss of structure support that can occur in loose, saturated soil during or following seismic shaking. The loss of strength is due to the tendency of loose soils to contract and compress when shaken. In a seismic event, liquefaction can produce a number of ground effects, including lateral spreading, ground lurching, and settlement of the fill material. In the Bracut vicinity, the soil primarily consists of orange-brown, non-marine sandstone with clay and gravel (Hookton Formation). The sandstone is usually medium-grained, well sorted, and poorly cemented. Minor beds of well-rounded pebbles and cobbles of chert, quartz, and green stone are also present. There are no highway structural improvements north of the Route 101/255 interchange; consequently, the geology setting is not discussed north of this interchange.

The proposed project is located entirely within the County of Humboldt and there are no National Natural Landmarks listed within the County of Humboldt. *(Source: U.S. Department of Interior, National Park Service, 2009)*

Except for the far northern segment of the Eureka-Arcata corridor, the project is within the tsunami evacuation zone. This zone is marked with tsunami hazard signs clearly visible to northbound and southbound travelers within the corridor. Generally, the highway segment adjacent to Humboldt Bay is within the tsunami evacuation zone. When a tsunami does occur, residents of many coastal communities will receive the alert to evacuate their homes and head for higher ground.

ENVIRONMENTAL CONSEQUENCES

Temporary effects to soils and geological features would occur during construction activities such as grading, leveling, and construction of the proposed grade separation at Indianola Cutoff. Effects would be similar for any one of the Build Alternatives; however, since Alternatives 1 and 1A do not include a grade separation, it would require much less ground disturbance and would result in fewer impacts to soils and geological features.

Construction of a grade separation structure at Route 101 and Indianola Cutoff, as well as other roadway work, would require placing approximately 400,000 cubic yards of imported earth fill material. Since Alternative 3 would require additional earthwork at the Route 101/Airport Road intersection, 3,000 cubic yards more than Alternative 2 would be required. Modified Alternative 3A, which includes a steep slope grade separation at Indianola Cutoff, would require 270,000 cubic yards of earth fill import.

For Alternative 1, construction of only the acceleration and deceleration improvements, with no grade separation, would require placing up to 65,000 cubic yards fill import. Alternative 1A, which includes constructing new turnarounds (U-turns) in the Route 101 median, would require approximately 60,000 cubic yards fill import.

The overall project would generate a negligible quantity of excavated material (utility trenching and structure foundation excavation). Any material generated would be reused in the large fill required to construct the grade separation at Indianola Cutoff.

The existing subsurface clay soil is compressible and placing fill material on native soil at the proposed interchange location would result in consolidation of subsurface soils. Consequently, subsurface settlement of the proposed roadway and Indianola Cutoff interchange would be addressed by installing prefabricated vertical drains (PVDs). PVDs, sometimes referred to as wick drains, do not wick or draw water. They are nicknamed wick drains because they look like large oil lamp wicks. These drains provide a preferential path (a shorter path with less resistance) for water to vertically move from compressed water saturated impervious soil layers to more permeable (porous) layers. Little water, if any, would rise to the surface; any water that does surface would be collected and properly processed/disposed. Water would only move through the vertical drains during the six months the soil is being compacted by the fill; after approximately six months the settlement would reach a point of equilibrium and only negligible settling and vertical water movement would occur. For these reasons, the piles and PVDs are not expected to impact the quality or quantity of groundwater.

The project area would likely be subjected to substantial seismically-induced ground shaking within the design life of any one of the Build Alternatives. The Caltrans California Seismic Hazard Map, dated 1996, indicates that the Mad River Fault, located approximately 6.2 miles northeast of the project site, could produce a maximum credible earthquake (MCE) magnitude of 6.75. There are several other faults in the vicinity of the site with MCE estimates between 6.0 and 7.0. In general, strong ground shaking can cause one or more of the following:

- Densification of loose granular soils;
- Cracking, spreading, and settlement of embankment material;
- Failure of embankments and natural slopes;
- Liquefaction; and
- Structural distress to bridges, retaining walls, and culverts.

Surface fault rupture and resulting displacement is not expected since there are no known active faults crossing Route 101 between Eureka and Arcata.

During a tsunami evacuation, Indianola Cutoff and Route 101 between Eureka and Arcata would provide direct evacuation routes to higher elevations beyond the tsunami hazard areas.

Even though the Route 101 median openings would be closed after project construction, none of the alternatives would substantially hinder a tsunami evacuation because either direction of travel within the Route 101 corridor between Eureka and Arcata would eventually provide direct access to higher elevation land above or beyond the hazard zone. In fact, any of the Build Alternatives would eliminate non-signalized cross traffic and would improve traffic flow during an evacuation.

AVOIDANCE, MINIMIZATION, AND/OR MITIGATION MEASURES

Other than the slopes for the proposed grade separation, none of the Build Alternatives would alter the local topography and, as such, would not affect slope stability within the project area.

The proposed Route 101/Indianola Cutoff grade separation and bridge structures would be designed to able to withstand a Maximum Credible Earthquake (MCE). Seismic design criteria for the proposed grade separation structure are intended to ensure both non-collapse and serviceability when subjected to ground motions during a seismic event.

Best Management Practices (BMPs), minimization measures for soil erosion and water quality, and post-construction re-vegetation that are proposed as part of the Corridor Improvement Project would minimize erosion impacts to soils during and after construction. No other measures to minimize harm are required.

3.2.4 Paleontology

REGULATORY SETTING

Paleontology is a natural science focused on the study of ancient animal and plant life as it is preserved in the geologic record as fossils. This project involves federal, state and local funding. The project area is on Caltrans right-of-way and privately-owned lands. Therefore, the following federal and state laws would apply to this project.

16 United States Code (USC) 461-467 (the National Registry of Natural Landmarks) establishes the National Natural Landmarks (NNL) program. Under this program, property owners agree to protect biological and geological resources such as paleontological features. Federal agencies and their agents must consider the existence and location of designated NNLs, and of areas found to meet the criteria for national significance, in assessing the effects of their activities on the environment under NEPA.

23 United States Code (USC) 1.9(a) requires that the use of federal-aid funds must be in conformity with federal and state law.

23 United States Code (USC) 305 authorizes the appropriation and use of federal highway funds for paleontological salvage as necessary by the highway department of any state, in compliance with 16 USC 431-433 above and state law.

Under California law, unique paleontological resources are protected by the California Environmental Quality Act (CEQA).

The California Coastal Act, in part, authorizes the California Coastal Commission (CCC) to review permit applications for development within the Coastal Zone and, where necessary, to require reasonable mitigation measures to offset effects of that development. Permits for development are issued with "special conditions" to ensure implementation of these mitigation measures.

Section 30244 of the Act, "Archaeological or Paleontological Resources," states that:

> Where development would adversely impact archaeological or paleontological resources as identified by the State Historic Preservation Officer, reasonable mitigation measures shall be required.

No specific regulations in the Humboldt County General Plan address paleontological resources. No local rules or regulations address paleontological resources for the Project area.

AFFECTED ENVIRONMENT

A Paleontological Resources Memorandum was prepared for the project by Caltrans. This report was prepared to identify the paleontological resources within the project area and is summarized below.

Generally, scientifically important paleontological resources are identified sites or geologic deposits containing individual fossils or assemblages of fossils that are unique or unusual, diagnostically or stratigraphically[18] important, and add to the existing body of knowledge in specific areas, stratigraphically, taxonomically, or regionally (Reynolds 1990). Particularly important are fossils found *in situ* (undisturbed) in primary context (i.e., fossils that have not been subjected to disturbance subsequent to their burial and fossilization). As such, they aid in stratigraphic correlation, particularly those that can provide data for the interpretation of tectonic events, geomorphological evolution, paleoclimatology, the relationships between aquatic and terrestrial species, and evolution in general. Discovery of *in situ* fossil bearing deposits is rare for many species, especially vertebrates. Terrestrial vertebrate fossils are often assigned greater importance than other fossils because they are rarer than other types of fossils. While fossils could be disturbed by drilling, they still have significance because their source can be closely estimated in the boring, thus they are important.

[18] Stratigraphy is the study of rock strata (layers), especially the distribution, deposition, and age of sedimentary rocks.

Geologic Units in the Vicinity of the Proposed Project

In the hills flanking Humboldt Bay to the east and in the bay, five geologic units are known to contain fossils: Franciscan Complex, Wildcat Group, Falor Formation, Hookton Formation, and bay mud sediment. Figure 3-24 is a geology map of the Humboldt Bay region showing approximate locations of these geologic units. In summary, the Hookton Formation likely directly underlies the Humboldt Bay mud sediment since it is at the top of the geologic "section" along the east bay margin; however, the subsurface geology is probably more complex.

The oldest rocks were mapped as Cretaceous-Tertiary Franciscan Complex and these rocks contain local and rare fossil sites. *(Source: Kelley, F. R., 1984)* Although fossils are not often found in the Franciscan Complex, any which are found would provide important data on the age of the strata. As a result, the Franciscan Complex has a high potential to contain scientifically important fossils in the region. The Franciscan Complex is overlain unconformably by the late Miocene to middle Pleistocene undifferentiated Wildcat Group, consisting of marine and terrestrial deposits. The Wildcat Group is composed of five formally recognized formations, which were originally identified in the area of the Eel River, Carlotta, Rio Dell, and Scotia Bluffs. *(Source: Kelley, F. R., 1984)* The marine portion of the Wildcat Group includes 6,000 to 8,000-feet thick mudstone and lesser sandstone deposited in a deep coastal basin. Fossil whales, shells, and microfossils have been collected from the various geologic formations comprising the Wildcat Group; therefore it is considered to have high potential to contain scientifically important fossils. The Wildcat Group is overlain by a middle Pleistocene unconformity.

The Pleistocene Falor Formation is named for exposures near the Falor Ranch, along Maple Creek (in the Blue Lake USGS quadrangle). Adjacent to Humboldt Bay, the Falor Formation was mapped in fault contact with the Franciscan Complex; no depositional contacts were identified. *(Source: Kelley, F. R., 1984)* The Falor Formation consists of poorly consolidated sand, silt, and clay deposited in shallow marine, estuarine, and fluvial environments; the formation contains a 1.8-2.0 million year old volcanic ash layer near its depositional base. The Falor Formation was documented to contain a faunal assemblage of 44 fossil species at four localities in the area of Blue Lake. *(Source: Manning and Ogle, 1950)* The faunal assemblage included mollusks, echinoids (such as sand dollars), and plants. More recent studies have shown the presence of vertebrates such as stingrays and skates as well. *(Source: Boessnecker, R. W. 2011)* The Falor Formation is considered to have a high potential to contain scientifically important fossils as it has produced vertebrate fossils.

The Pleistocene Hookton Formation is named for the Hookton-Table Bluff area, which contains numerous, more or less typical exposures. The Hookton Formation was deposited over an unconformity above the Wildcat Group and consists of reddish-brown gravel, sand, silt and clay, and gray silty clay. Though chiefly formed on a coastal plain, the Hookton Formation contains estuarine and shallow marine deposits. Fossil shells from the lower Hookton Formation, found near the northern end of Humboldt Hill, have provided dates of 160,000 years, while volcanic ash in the lower Hookton Formation was dated at 450,000 years. The upper Hookton Formation contains Pleistocene-age vertebrate fossils including bison, mammoth, and mastodon which were collected near Buhne Point (approximately 8 miles away from project activities). The Hookton Formation is overlain by marine terraces which have been preserved and uplifted along the coast. *(Source: Earth Science Associates, 1975)*

In Humboldt Bay, late Holocene bay deposits overlie the geologic units previously described—including the Hookton Formation and overlying marine terrace deposits that occur directly above the Hookton Formation. Near stream mouths, bay deposits are intermixed with terrestrial stream deposits. The sediment filling the bay likely contains macroscopic and microscopic fossils. Shells and wood were encountered in bay deposits during drilling along the bay margin, and likely microfossils include palynomorphs (pollen, spores, and dinoflagellates) and various microscopic marine organisms. Microfossils likely to be encountered in the bay deposits of Humboldt Bay may provide important information about climatic change and past tectonic activity. Humboldt State University Professor William Miller, a paleontologist, was consulted about the proposed excavation of bay sediment. He stated that any paleontological resources that may be encountered during construction would be scientifically important given there is relatively little known about the subsurface stratigraphy and geologic history of Humboldt Bay. *(Source: Narwold Personal communication, 2012)*

During the late 1800's and early 1900's, extensive areas of natural tideland along the eastern margin of Humboldt Bay were filled. The Eureka-Arcata Route 101 Corridor was constructed primarily on fill material overlaying the former bay and the Hookton Formation. *(Source: City of Eureka, 2008)*

Subsurface Information

Subsurface drilling investigations performed by Caltrans at Bracut encountered 3.7 to 6.5 feet of fill above the bay deposits. Fill is material that has been excavated from another location and moved to its present site during the construction of the roadway. As a result, any fossils that fill may contain do not have scientific value as the provenance is unknown. Therefore, fill is designated as having no potential for containing important paleontological resources.

Borings at Bracut encountered 3.7' to 6.5' of fill above bay deposits. Below the bay deposits, at depths of 13' and 28.5' below the surface, borings encountered reddish-brown, silty sand that likely is the Hookton Formation. The Hookton Formation was exposed at Bracut; the exposure is visible in photos from the 1940's.

Borings have encountered hard material beneath bay deposits at four locations. At Jacoby Creek bridge (PM 84.5) and Gannon Slough (PM 84.7), borings encountered a sequence of dense to very dense, reddish-brown sand and gravel at depths of 50' to 60'.

At Gannon Slough, the dense reddish-brown, silty sand with gravel contained clasts of chert. This material was found in all four borings at Jacoby Creek bridge and all three borings at Gannon Slough where it is underlain by silty sand and clay similar to the bay deposits above.

Near PM 81.5, on the right side of Route 101, a similarly hard material was encountered at a depth of 50'. At this location the material was interpreted by a geologist, experienced in Quaternary geology, as a geologic unit (perhaps Hookton) buried co-seismically by inundation of the bay resulting from an earthquake and subsidence. Based on this information, the hard material encountered at Jacoby Creek bridge, Gannon Slough bridge, and elsewhere is considered potential "bedrock".

Three borings were drilled near PM 82.3 to depths of 30' to 60' (Smith and Tatum, 1966). The area is near the Indianola Cutoff (PM 82.67). Most of the material encountered in the three borings was soft to firm clay and clayey silt, silty clay, and silty clayey sand similar to bay deposits; however, a dense gray, sand and gravel section was encountered at the bottom of one boring at a depth of 39' to 42'. The boring is located east of the highway. This may be similar to hard material encountered elsewhere.

Caltrans borings have encountered shell fragments and pieces of wood at varying depths. At Jacoby Creek bridge, fragments of wood were found at depths of 36.5', 131', 141' and 150'. At 150', very dense sand and gravel were encountered with wood. At Gannon Slough bridge, borings encountered wood and grasses at 22', and abundant shell fragments (possibly oysters) at 116'. North of Harper Ford, near PM 81.5, shell fragments in gray silt with clay were found at 10' to 11' and 40' to 41', and a small chunk of wood was found at 35'.

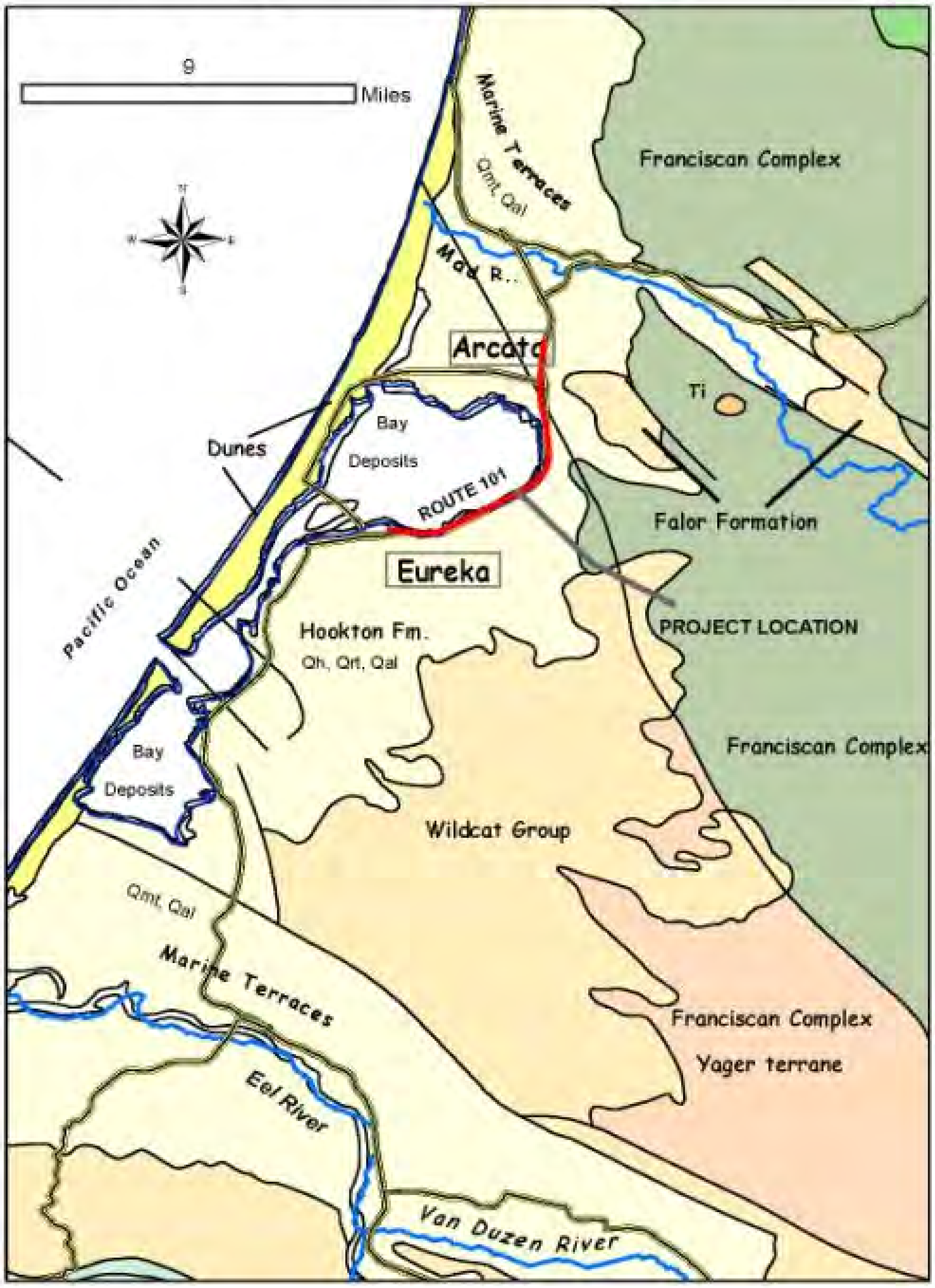

Figure 3-24 Geology of the Humboldt Bay Area

ENVIRONMENTAL CONSEQUENCES

Most of the proposed project roadway construction activities would occur above or within the existing roadway fill; any work within the existing fill would avoid paleontological resources. However, pile driving activities at the proposed southbound Jacoby Creek bridge replacement and at the new grade separation at the Route 101/Indianola Cutoff would encounter bay deposits (below the existing roadway fill) and other known fossil-bearing units.

All Build Alternatives include replacing the southbound Jacoby Creek bridge. The new bridge would require driving support piles that would extend below the highway fill to bay sediment deposits that likely contain some of the paleontological resources described in the Affected Environment section. Approximately fourteen 3-foot diameter cast-in-place steel shell piles would be oscillated or rotated into place: seven piles on each side of the bank—three per side of bank for the temporary bridge and four per side of bank for the permanent bridge. The piles would be about 15 feet from the creek-bay mean higher water elevation. The depths at which the piles would need to be set are not currently known; however, depths could be up to 100 feet pending the outcome of further design. As the open end cast-in-place steel shell piles are driven, excavated earth would be removed from inside the upper section of the steel shell pile. After removal of all accumulated material within the pile, the pile would then be filled with reinforced concrete. All excavated material from the pile would be temporarily stockpiled, contained, and eventually transported to an approved disposal site. Excavation at the bridge abutments is currently estimated to extend approximately five feet below the surface.

Only Alternatives 2, 3, and Modified 3A include constructing a new grade separation at the Route 101/Indianola Cutoff intersection. Construction of the grade would require driving piles below the highway fill. Unlike the new bridge, the grade separation support structure design, as of this writing, is in the preliminary design phase and the number and type of piles have not been determined. If precast pre-stressed concrete piles are used, about 20 at each of the two abutments would be driven in place. The concrete piles would either be 14-inch square or 15-inch octagonal piles. Driving concrete piles would not result in any excavated bay sediment. Alternatively, instead of concrete piles, the structure design could require 30-inch or 36-inch diameter cast-in-steel shell piles with up to 10 piles at each of the two abutments. Similar to the Jacoby Creek bridge construction, excavated earth would be removed from inside the steel shell pile and filled with reinforced concrete. After the Final Environmental Impact Report/Statement is approved, final engineering designs would be completed and the exact number, type, and location of piles determined.

Construction activities as described above at Jacoby Creek bridge and Indianola Cutoff would encounter bay deposits and other known fossil-bearing units. The results of Caltrans geotechnical drilling indicate that macroscopic paleontological resources occur in the bay deposits. Because excavation can disturb or destroy paleontological resources, the potential for impacts is based on the depth and extent of excavation and paleontological sensitivity of the units.

Driving piles up to 3-feet in diameter at Jacoby Creek bridge and Indianola Cutoff has the potential to encounter paleontological resources that possess scientific importance because it would provide information about subsurface stratigraphy and geologic history of Humboldt Bay. However, the types of microfossils likely to be observed are common and widespread in Humboldt Bay. Therefore, the project is not anticipated to have an adverse impact on unique paleontological resources.

While the types of paleontological resources that would be encountered are common and widespread, the opportunity to access them is rare and the paleoclimatic and statigraphic data they provide has great scientific value. Therefore, based on discussion with Humboldt State University, Caltrans has committed to collect representative examples of the bay muds and underlying formations encountered at the Jacoby Creek bridge and Indianola Cutoff rather than discard the material. Sample collection would be conducted by a qualified professional paleontologist to ensure the scientific integrity of the samples. The samples would be sent to a facility that would properly house and label them, maintain field data and provenance, and make the material and information available to the scientific community.

AVOIDANCE, MINIMIZATION, AND/OR MITIGATION MEASURES

As discussed above, total avoidance of paleontological resources during pile driving at Jacoby Creek bridge and Indianola Cutoff cannot be assured. However, the resources (microfossils) likely encountered are common and widespread in Humboldt Bay. The project is not anticipated to have adverse impact on unique paleontological resources. Therefore, no mitigation measures are required; however, Caltrans has committed to collect representative samples as previously described.

3.2.5 Hazardous Waste / Materials

This section is based on the Phase 1 Environmental Site Assessment (URS 2003), Updated Initial Site Assessment (Caltrans 2003), and Preliminary Site Investigation (Caltrans 2006). This section was reviewed and updated in 2010, 2015 and 2016 by a Caltrans Hazardous Waste specialist.

REGULATORY SETTING

Hazardous materials and hazardous wastes are regulated by many state and federal laws. These include not only specific statutes governing hazardous waste, but also a variety of laws regulating air and water quality, human health and land use.

The primary federal laws regulating hazardous wastes/materials are the Resource Conservation and Recovery Act of 1976 (RCRA) and the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA). The purpose of CERCLA, often referred to as Superfund, is to clean up contaminated sites so that public health and welfare are not compromised. RCRA provides for "cradle to grave" regulation of hazardous wastes. Other federal laws include:

- Community Environmental Response Facilitation Act (CERFA) of 1992
- Clean Water Act
- Clean Air Act
- Safe Drinking Water Act
- Occupational Safety and Health Act (OSHA)
- Atomic Energy Act
- Toxic Substances Control Act (TSCA)
- Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)

In addition to the acts listed above, Executive Order 12088 - Federal Compliance with Pollution Control, mandates that necessary actions be taken to prevent and control environmental pollution when federal activities or federal facilities are involved.

Hazardous waste in California is regulated primarily under the authority of the federal Resource Conservation and Recovery Act of 1976, and the California Health and Safety Code. Other California laws that affect hazardous waste are specific to handling, storage, transportation, disposal, treatment, reduction, cleanup and emergency planning.

Worker health and safety and public safety are key issues when dealing with hazardous materials that may affect human health and the environment. Proper disposal of hazardous material is vital if it is disturbed during project construction.

AFFECTED ENVIRONMENT

The affected environment was evaluated for hazardous waste/materials issues by researching historical land use, reviewing available databases regarding chemical storage or use, and by physical inspection.

The historical land use was evaluated primarily by a review of aerial photographs of the site and vicinity. The purpose of the historical review was to evaluate whether past uses within and adjacent to the project area may have created adverse environmental conditions that would not appear in the regulatory records review nor be visible during on-site field reconnaissance.

Three sets of aerial photographs of the project area and vicinity were reviewed. The photographs were taken in 1941, 1950, and 1958. The three sets of photographs reveal that earlier land uses around the project area and surrounding properties included farmlands, wetlands, private residences, industrial and commercial businesses, railroad tracks, and an airport.

A review of aerial photographs revealed land uses around a portion of the project area included an airport and industrial businesses such as a lumber mill. The aircraft fuel and chemicals for industrial use were most likely stored in drums, above ground storage tanks, and underground storage tanks. Soil and/or groundwater may have been affected from historical leaks and/or spills and misuse of these chemicals on the properties. The use of these chemicals and fuels were found to be not sufficiently close to the project corridor to likely have an impact on proposed improvements.

A regulatory database search report was conducted for a study area that included a 0.5-mile wide corridor between the project construction limits. A database search can identify areas that have known or documented environmental conditions that may affect soil or groundwater within the project area. The regulatory database search retrieved properties within the study area that are listed on 23 federal environmental databases, 19 state or local environmental databases, and two Environmental Data Resources, Inc. proprietary historical databases. The results of the database search include the following:

- Addresses of known underground storage tank sites
- Addresses of landfills
- Hazardous waste generation, treatment, storage and/or disposal facilities
- Subsurface contamination known to be present in the study area

No sites within the proposed project area were identified in the regulatory databases search; however, 513 sites were identified in the study area within 0.5 mile of the project area/existing highway right-of-way. Note that each site may be occupied with multiple facilities. In addition, some sites are listed in multiple databases. A facility or land use is considered to be of potential concern when it is listed on one of the following databases of reported hazardous materials releases:

- National Priority List (NPL)
- Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS)
- State Deed Restrictions, California State Spills, Leaks, Investigation, and Cleanup (CA SLIC)
- State Leaking Underground Storage Tank (LUST)
- 1998 California Hazardous Waste and Substances Site List (formerly the Cortese List)
- State Toxic Pits

Based on the database searches, no facilities in the project area were listed.

File and record reviews were also conducted at the Humboldt County Department of Environmental Health (HCDEH), Regional Water Quality Control Board, and Department of Toxic Substances Control in November 2002 to identify any facilities considered to be of potential concern from contamination potentially migrating into the project area (but not listed in the database as being closed or requiring further action).

The following facilities were reviewed in detail and it was found that the eastward flowing groundwater gradient would likely cause containment plumes to migrate away from the project corridor, or the site has been remediated and the case file closed, or the site is sufficiently distant to the project corridor that impacts are unlikely.

- Eureka Oxygen Company, at 2810 Jacobs Avenue, and less than 100 feet from the existing Route 101 right-of-way, is a fire extinguisher and compressed gas sales company that had leaking underground storage tanks. An environmental investigation for contaminated groundwater from USTs is currently being conducted. Underground storage tanks were removed in August 2002, but groundwater is still being monitored. The site received a case closure from the Regional Water Quality Control Board in September 2003.

- Humboldt County Department of Public Works, at 3130 Jacobs Avenue, and less than 100 feet from the existing Route 101 right-of-way, is a vehicle maintenance facility and garage that had leaking underground storage tanks. An environmental investigation for contaminated groundwater and soil from underground storage tanks is currently being conducted. The site received a case closure from the Regional Water Quality Control Board in May 2005.

- Trinity Diesel Inc., at 3408 Jacobs Avenue, and less than 100 feet from the existing Route 101 right-of-way, is an automobile/truck repair facility. In 1998, the business cleaned and backfilled a waste oil separator. During construction, metals and hydrocarbons as diesel were found in the drainage ditch soil. County files contain a letter from the Regional Water Quality Control Board requesting additional information about analytical reports, but no further correspondence was included.

- Humboldt County Aviation/Northern Air/Chevron 8-4101, at 4100-4102 Jacobs Avenue at the Murray Field Airport, is an airport fueling station. The Chevron aircraft refueling station is closed and an environmental investigation for contaminated groundwater and soil from underground storage tanks containing aircraft fuel was conducted. The RWQCB issued a No Further Action letter on December 9, 1997. The Environmental Protection Agency (USEPA) reopened the site on December 29, 1999 in response to an unidentified leaking pipeline uncovered during construction in September 1999.

A general reconnaissance of the study area was conducted on November 5 and 6, 2002. The site reconnaissance was conducted to evaluate the presence of potential hazardous waste sites identified during the database search, aerial photograph review, and other potential hazardous waste issues within and adjacent to the project area/highway right-of-way. This visual site reconnaissance was conducted from points of public access (closest possible vantage points) and focused on the identification of land uses and potential hazardous conditions within the project area/highway right-of-way. No interviews were conducted, and no unauthorized site walks were undertaken at surrounding businesses. Detailed observations of building interiors and other structures were not made. There was no visible evidence of contamination migrating into the project area from any identified hazardous waste sites.

Aerially Deposited Lead

Several decades of vehicles operating on gasoline with lead additive have resulted in the deposition of lead as "aerially deposited lead (ADL)" within the shallow soil of the unpaved roadway shoulders and median of Route 101. Although the U.S. Clean Air Act Amendments of 1990 mandated the elimination of lead from all U.S. motor fuel by January 1, 1996, ADL persists in the unpaved portions of the roadway. ADL-impacted soils along the project area pose a concern for the off-site reuse or disposal of soil generated from roadway construction and for construction worker safety.

Aerially deposited lead (ADL) from the historical use of leaded gasoline, exists along roadways throughout California. There is the likely presence of soils with elevated concentrations of lead as a result of ADL on the state highway system right of way within the limits of the project alternatives that must be managed under the July 1, 2016, ADL Agreement between Caltrans and the California Department of Toxic Substances Control. This Agreement allows such soils to be safely reused within the project limits as long as all requirements of the Agreement are met.

A preliminary site investigation entitled, "*Aerially Deposited Lead and Lead/Chromium Based Paint Site Investigation*" was completed in December 2005. Numerous samples were taken throughout the project limits. The test results indicate that within the project area limits, excavated material could likely be reused within the project construction limits in compliance with the constraints of the California Department of Toxic Substances Control (DTSC) Soil Management Agreement for Aerially Deposited Lead-Contaminated Soils (agreement) issued to Caltrans. This agreement is described in the Avoidance, Minimization, and/or Mitigation Measures section.

Asbestos Within Roadway Bridges

All Build Alternatives include replacing the Route 101 southbound Jacoby Creek bridge and replacing the bridge rail on both the Route 101 northbound Jacoby Creek bridge and the northbound Gannon Slough bridge. A records review of these three separate bridges revealed the southbound Jacoby Creek bridge was constructed with some asbestos sheet packing material, which would need to be abated during demolition. These three structures are composed primarily of Portland concrete cement and were not painted, thus lead base paint residues are not expected to be present.

Naturally Occurring Asbestos (NOA)

Naturally occurring asbestos (NOA) is present within some parts of Humboldt County; however, the closest of these NOA areas is approximately twenty miles easterly of the project site and thus not of concern for this project.

ENVIRONMENTAL CONSEQUENCES

Since ADL is present in soil adjacent to the Route 101 traveled way, ADL would be encountered during construction involving earthwork for any of the proposed Build Alternatives. Handling, storing, reuse, and disposal of ADL contaminated soil are discussed in the Avoidance, Minimization, and/or Mitigation Measures section.

The replacement of the southbound Jacoby Creek bridge is included in all Build Alternatives. Although asbestos would be encountered during bridge demolition, it is very unlikely that any release would occur since the construction contractor would be notified of the presence of asbestos in contract bid documents and would be required to handle the material so that no release could occur.

The paint striping on the bridge deck, as well as at other proposed re-stripe locations, would be considered waste when removed.

AVOIDANCE, MINIMIZATION, AND/OR MITIGATION MEASURES

ADL

Any excavated material removed, stockpiled, or loaded would require testing for ADL levels prior to transport, reuse, or disposal and would need to comply with the California Department of Toxic Substances Control (DTSC) Soil Management Agreement for Aerially Deposited Lead-Contaminated Soils (agreement). This agreement applies to all 12 Caltrans districts. (The agreement is available at: https://www.dtsc.ca.gov/SiteCleanup/Projects/Caltrans_ADL.cfm)

Provided Caltrans meets the terms and conditions of the agreement, DTSC establishes the management of ADL soil considered within the requirements of Health and Safety Code, Chapter 6.5, and California Code of Regulations, Title 22, for soil containing aerially deposited lead when it is reused in transportation projects on the state highway system. The agreement establishes requirements for the transportation, management, storage and placement of ADL soils.

The agreement applies to soil that is impacted primarily because of aerially deposited lead contamination associated with exhaust from the operation of motor vehicles. If the soil tests within the ADL agreement thresholds, aerially deposited lead contaminated soil can be reused only in strict accordance with the specific conditions, limitations, and other requirements of the agreement.

One agreement restriction specifies lead-contaminated soil must be placed a minimum of five feet above the maximum historic water table elevation and covered by at least one foot of nonhazardous soil. Groundwater depth within the project limits is often near the surface and can fluctuate with the bay tide cycle. To comply with this restriction, groundwater depth would be considered to be at, or near the surface of any original ground within the project construction limits. Consequently, the ADL contaminated soil would only be placed at locations at least 5 feet above original ground—such as at the fill of the proposed Indianola grade separation. The agreement also includes a requirement that the proper health and safety procedures would be followed for workers, including any persons engaged in maintenance work in areas where the waste has been buried and covered. Although unlikely, any excavated material that exceeds the ADL agreement threshold would be isolated and transported to a Class I or II waste facility.

Asbestos

The development of the final project plans, specifications, and estimates would direct the construction contractor's attention to the presence of asbestos in the southbound Jacoby Creek bridge and require an abatement plan. A National Emission Standards for Hazardous Air Pollutants permit would be required from the North Coast Unified Air Quality Management District for the demolition of this bridge.

Water Quality

The need to test for hazardous substances in water from dewatering operations, such as at the bridge construction site, was considered and determined not warranted. In areas of dewatering, the historical uses did not include the use or storage of chemicals. The hazardous waste investigation for this project indicated there was historical chemical use at certain locations, but beyond the existing state highway right-of-way.

The project would include implementation of stormwater quality BMP NS-2 that pertains to dewatering operations. In addition, a dewatering plan would be submitted as part of the SWPPP/WPCP detailing the location of dewatering activities, equipment, and discharge point. (See the previous section (Water Quality) regarding discussion of on-site hazardous waste/toxic materials spill prevention and accidental spill response plan.)

After measures to minimize are implemented, there would be no substantial health risks from the handling of hazardous substances or waste to the surrounding environment, construction workers, or the public during and after project construction.

3.2.6 Air Quality

REGULATORY SETTING

The Federal Clean Air Act (FCAA), as amended, is the primary federal law that governs air quality while the California Clean Air Act is its companion state law. These laws, and related regulations by the U.S. Environmental Protection Agency (USEPA) and California Air Resources Board (CARB), set standards for the concentration of pollutants in the air. At the federal level, these standards are called National Ambient Air Quality Standards (NAAQS). NAAQS and state ambient air quality standards have been established for six transportation-related criteria pollutants that have been linked to potential health concerns: carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), particulate matter (PM) (which is broken down for regulatory purposes into particles of 10 micrometers or smaller (PM_{10}) and particles of 2.5 micrometers and smaller ($PM_{2.5}$)), and sulfur dioxide (SO_2). In addition, national and state standards exist for lead (Pb), and state standards exist for visibility reducing particles, sulfates, hydrogen sulfide (H_2S), and vinyl chloride. The NAAQS and state standards are set at levels that protect public health with a margin of safety, and are subject to periodic review and revision. Both state and federal regulatory schemes also cover toxic air contaminants (air toxics); some criteria pollutants are air toxics or may include certain air toxics in their general definition.

Federal air quality standards and regulations provide the basic scheme for project-level air quality analysis under the National Environmental Policy Act (NEPA). In addition to this environmental analysis, a parallel "Conformity" requirement under the FCAA also applies.

Conformity

The conformity requirement is based on Federal Clean Air Act Section 176(c), which prohibits the U.S. Department of Transportation (USDOT) and other federal agencies from funding, authorizing, or approving plans, programs, or projects that do not conform to the State Implementation Plan (SIP) for attaining the NAAQS. "Transportation Conformity" applies to highway and transit projects and takes place on two levels: the regional—or planning and programming—level and the project level. The proposed project must conform at both levels to be approved.

Conformity requirements apply only in nonattainment and "maintenance" (former nonattainment) areas for the NAAQS, and only for the specific NAAQS that are or were violated. USEPA regulations at 40 Code of Federal Regulations (CFR) 93 govern the conformity process. Conformity requirements do not apply in unclassifiable/attainment areas for NAAQS and do not apply at all for state standards regardless of the status of the area.

Regional conformity is concerned with how well the regional transportation system supports plans for attaining the NAAQS for carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), particulate matter (PM_{10} and $PM_{2.5}$), and in some areas (although not in California) sulfur dioxide (SO_2). California has nonattainment or maintenance areas for all of these transportation-related “criteria pollutants” except SO_2, and also has a nonattainment area for lead (Pb); however, lead is not currently required by the FCAA to be covered in transportation conformity analysis. Regional conformity is based on emission analysis of Regional Transportation Plans (RTPs) and Federal Transportation Improvement Programs (FTIPs) that include all transportation projects planned for a region over a period of at least 20 years for the RTP, and 4 years for the FTIP. RTP and FTIP conformity uses travel demand and emission models to determine whether or not the implementation of those projects would conform to emission budgets or other tests at various analysis years showing that requirements of the Clean Air Act and the SIP are met. If the conformity analysis is successful, the Metropolitan Planning Organization (MPO), Federal Highway Administration (FHWA), and Federal Transit Administration (FTA), make determinations that the RTP and FTIP are in conformity with the SIP for achieving the goals of the Clean Air Act. Otherwise, the projects in the RTP and/or FTIP must be modified until conformity is attained. If the design concept, scope, and “open-to-traffic” schedule of a proposed transportation project are the same as described in the RTP and FTIP, then the proposed project meets regional conformity requirements for purposes of project-level analysis.

Conformity analysis at the project-level includes verification that the project is included in the regional conformity analysis and a “hot-spot” analysis if an area is “nonattainment” or “maintenance” for carbon monoxide (CO) and/or particulate matter (PM_{10} or $PM_{2.5}$). A region is “nonattainment” if one or more of the monitoring stations in the region measures a violation of the relevant standard and the USEPA officially designates the area nonattainment. Areas that were previously designated as nonattainment areas but subsequently meet the standard may be officially re-designated to attainment by the USEPA, and are then called “maintenance” areas. “Hot-spot” analysis is essentially the same, for technical purposes, as CO or particulate matter analysis performed for NEPA purposes. Conformity does include some specific procedural and documentation standards for projects that require a hot-spot analysis. In general, projects must not cause the “hot-spot”-related standard to be violated, and must not cause any increase in the number and severity of violations in nonattainment areas. If a known CO or particulate matter violation is located in the project vicinity, the project must include measures to reduce or eliminate the existing violation(s) as well.

Table 3-16 is a summary of air quality standards, the effects and typical sources of pollutants, and the attainment/nonattainment status of the project area.

Table 3-16 State and Federal Criteria Air Pollutant Standards, Effects, and Sources

Pollutant	Averaging Time	State Standards 1	National Standards 2		Principal Health and Atmospheric Effects	Typical Sources	Project Area Attainment Status
		Concentration 3	Primary 3,5	Secondary 3,6			
Ozone (O_3)	1 Hour	0.09 ppm (180 µg/m3)	—	Same as Primary Standard	High concentrations irritate lungs. Long-term exposure may cause lung tissue damage and cancer. Long-term exposure damages plant materials and reduces crop productivity. Precursor organic compounds include many known toxic air contaminants. Biogenic VOC may also contribute.	Low-altitude ozone is almost entirely formed from reactive organic gases/volatile organic compounds (ROG or VOC) and nitrogen oxides (NOx) in the presence of sunlight and heat. Common precursor emitters include motor vehicles and other internal combustion engines, solvent evaporation, boilers, furnaces, and industrial processes.	Federal: State:
	8 Hour	0.070 ppm (137 µg/m3)	0.075 ppm (147 µg/m3)				
Respirable Particulate Matter (PM10)8	24 Hour	50 µg/m3	150 µg/m3	Same as Primary Standard	Irritates eyes and respiratory tract. Decreases lung capacity. Associated with increased cancer and mortality. Contributes to haze and reduced visibility. Includes some toxic air contaminants. Many toxic and other aerosol and solid compounds are part of PM10.	Dust- and fume-producing industrial and agricultural operations; combustion smoke and vehicle exhaust; atmospheric chemical reactions; construction and other dust-producing activities; unpaved road dust and re-entrained paved road dust; natural sources.	Federal: State:
	Annual Arithmetic Mean	20 µg/m3	—				
Fine Particulate Matter (PM2.5)8	24 Hour	—	35 µg/m3	Same as Primary Standard	Increases respiratory disease, lung damage, cancer, and premature death. Reduces visibility and produces surface soiling. Most diesel exhaust particulate matter – a toxic air contaminant – is in the PM2.5 size range. Many toxic and other aerosol and solid compounds are part of PM2.5.	Combustion including motor vehicles, other mobile sources, and industrial activities; residential and agricultural burning; also formed through atmospheric chemical and photochemical reactions involving other pollutants including NOx, sulfur oxides (SOx), ammonia, and ROG.	Federal:
	Annual Arithmetic Mean	12 µg/m3	12 µg/m3	15 µg/m3	Increases respiratory disease, lung damage, cancer, and premature death. Reduces visibility and produces surface soiling. Most diesel exhaust particulate matter – a toxic air contaminant – is in the PM2.5 size range. Many toxic and other aerosol and solid compounds are part of PM2.5.	Combustion including motor vehicles, other mobile sources, and industrial activities; residential and agricultural burning; also formed through atmospheric chemical and photochemical reactions involving other pollutants including NOx, sulfur oxides (SOx), ammonia, and ROG.	State:
Carbon Monoxide (CO)	1 Hour	20 ppm (23 mg/m3)	35 ppm (40 mg/m3)	—	CO interferes with the transfer of oxygen to the blood and deprives sensitive tissues of oxygen. CO also is a minor precursor for photochemical ozone. Colorless, odorless.	Combustion sources, especially gasoline-powered engines and motor vehicles. CO is the traditional signature pollutant for on-road mobile sources at the local and neighborhood scale.	Federal: State:
	8 Hour	9.0 ppm (10 mg/m3)	9 ppm (10 mg/m3)	—			

Table 3-16 State and Federal Criteria Air Pollutant Standards, Effects, and Sources

	8 Hour (Lake Tahoe)	6 ppm (7 mg/m3)	—	—	CO interferes with the transfer of oxygen to the blood and deprives sensitive tissues of oxygen. CO also is a minor precursor for photochemical ozone. Colorless, odorless.	Combustion sources, especially gasoline-powered engines and motor vehicles. CO is the traditional signature pollutant for on-road mobile sources at the local and neighborhood scale.	
Nitrogen Dioxide (NO2) 9	1 Hour	0.18 ppm (339 µg/m3)	100 ppb (188 µg/m3)	—	Irritating to eyes and respiratory tract. Colors atmosphere reddish-brown. Contributes to acid rain and nitrate contamination of stormwater. Part of the "NOx" group of ozone precursors.	Motor vehicles and other mobile or portable engines, especially diesel; refineries; industrial operations.	Federal: State:
					Irritating to eyes and respiratory tract. Colors atmosphere reddish-brown. Contributes to acid rain and nitrate contamination of stormwater. Part of the "NOx" group of ozone precursors.	Motor vehicles and other mobile or portable engines, especially diesel; refineries; industrial operations.	Federal: State:
	Annual Arithmetic Mean	0.030 ppm (57 µg/m3)	0.053 ppm (100 µg/m3)	Same as Primary Standard			
Sulfur Dioxide 10 **(SO2)**	1 Hour	0.25 ppm (655 µg/m3)	75 ppb (196 µg/m3)	—	Irritates respiratory tract; injures lung tissue. Can yellow plant leaves. Destructive to marble, iron, steel. Contributes to acid rain. Limits visibility.	Fuel combustion (especially coal and high-sulfur oil), chemical plants, sulfur recovery plants, metal processing; some natural sources like active volcanoes. Limited contribution possible from heavy-duty diesel vehicles if ultra-low sulfur fuel not used.	Federal: State:
	3 Hour	—	—	0.5 ppm (1300 µg/m3)	Irritates respiratory tract; injures lung tissue. Can yellow plant leaves. Destructive to marble, iron, steel. Contributes to acid rain. Limits visibility.		
	24 Hour	0.04 ppm (105 µg/m3)	0.14 ppm (for certain areas)10	—		Fuel combustion (especially coal and high-sulfur oil), chemical plants, sulfur recovery plants, metal processing; some natural sources like active volcanoes. Limited contribution possible from heavy-duty diesel vehicles if ultra-low sulfur fuel not used.	
	Annual Arithmetic Mean	—	0.030 ppm (for certain areas)10	—	Irritates respiratory tract; injures lung tissue. Can yellow plant leaves. Destructive to marble, iron, steel. Contributes to acid rain. Limits visibility.	Fuel combustion (especially coal and high-sulfur oil), chemical plants, sulfur recovery plants, metal processing; some natural sources like active volcanoes. Limited contribution possible from heavy-duty diesel vehicles if ultra-low sulfur fuel not used.	

Table 3-16 State and Federal Criteria Air Pollutant Standards, Effects, and Sources

Lead11,12	30 Day Average	1.5 µg/m3	—	—	Disturbs gastrointestinal system. Causes anemia, kidney disease, and neuromuscular and neurological dysfunction. Also a toxic air contaminant and water pollutant.	Lead-based industrial processes like battery production and smelters. Lead paint, leaded gasoline. Aerially deposited lead from older gasoline use may exist in soils along major roads.	Federal:
	Calendar Quarter	—	1.5 µg/m3 (for certain areas)12	Same as Primary Standard	Disturbs gastrointestinal system. Causes anemia, kidney disease, and neuromuscular and neurological dysfunction. Also a toxic air contaminant and water pollutant.	Lead-based industrial processes like battery production and smelters. Lead paint, leaded gasoline. Aerially deposited lead from older gasoline use may exist in soils along major roads.	State:
	Rolling 3-Month Average	—	0.15 µg/m3				
Visibility Reducing Particles13	8 Hour	See footnote 13	**No National Standards**		Reduces visibility. Produces haze. NOTE: not directly related to the Regional Haze program under the Federal Clean Air Act, which is oriented primarily toward visibility issues in National Parks and other "Class I" areas. However, some issues and measurement methods are	See particulate matter above. May be related more to aerosols than to solid particles.	Federal: n/a State:
Sulfates	24 Hour	25 µg/m3			Premature mortality and respiratory effects. Contributes to acid rain. Some toxic air contaminants attach to sulfate aerosol particles.	Industrial processes, refineries and oil fields, mines, natural sources like volcanic areas, salt-covered dry lakes, and large sulfide rock areas.	Federal: n/a State:
Hydrogen Sulfide	1 Hour	0.03 ppm (42 µg/m3)			Colorless, flammable, poisonous. Respiratory irritant. Neurological damage and premature death. Headache, nausea. Strong odor.	Industrial processes such as: refineries and oil fields, asphalt plants, livestock operations, sewage treatment plants, and mines. Some natural sources like volcanic areas and hot springs.	Federal: n/a: State:
Vinyl Chloride11	24 Hour	0.01 ppm (26 µg/m3)			Neurological effects, liver damage, cancer. Also considered a toxic air contaminant.	Industrial processes	Federal: n/a

(Source: CARB, 2013)

1. California standards for ozone, carbon monoxide (except 8-hour Lake Tahoe), sulfur dioxide (1 and 24 hour), nitrogen dioxide, and particulate matter (PM_{10}, $PM_{2.5}$, and visibility reducing particles), are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

2. National standards (other than ozone, particulate matter, and those based on annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration measured at each site in a year, averaged over three years, is equal to or less than the standard. For $PM_{10,}$ the 24 hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 µg/m3 is equal to or less than one. For $PM_{2.5}$, the 24 hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. Contact the USEPA for further clarification and current national policies.

3. Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

4. Any equivalent measurement method which can be shown to the satisfaction of the ARB to give equivalent results at or near the level of the air quality standard may be used. National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health. National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

5. Reference method as described by the USEPA. An “equivalent method” of measurement may be used but must have a “consistent relationship to the reference method” and must be approved by the USEPA.

6. On December 14, 2012, the national annual $PM_{2.5}$ primary standard was lowered from 15 µg/m3 to 12.0 µg/m3. The existing national 24- hour $PM_{2.5}$ standards (primary and secondary) were retained at 35 µg/m3, as was the annual secondary standard of 15 µg/m3. The existing 24-hour PM_{10} standards (primary and secondary) of 150 µg/m3 also were retained. The form of the annual primary and secondary standards is the annual mean, averaged over 3 years.

7. To attain the 1-hour national standard, the 3-year average of the annual 98th percentile of the 1-hour daily maximum concentrations at each site must not exceed 100 ppb. Note that the national 1-hour standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the national 1-hour standard to the California standards, the units can be converted from ppb to ppm. In this case, the national standard of 100 ppb is identical to 0.100 ppm.

8. On June 2, 2010, a new 1-hour SO_2 standard was established and the existing 24-hour and annual primary standards were revoked. To attain the 1-hour national standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 SO_2 national standards (24-hour and annual) remain in effect until one year after an area is designated for the 2010 standard, except that in areas designated nonattainment for the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved.

9. Note that the 1-hour national standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the 1-hour national standard to the California standard the units can be converted to ppm. In this case, the national standard of 75 ppb is identical to 0.075 ppm.

10. The ARB has identified lead and vinyl chloride as 'toxic air contaminants' with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

11. The national standard for lead was revised on October 15, 2008 to a rolling 3-month average. The 1978 lead standard (1.5 µg/m3 as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.

12. In 1989, the ARB converted both the general statewide 10-mile visibility standard and the Lake Tahoe 30-mile visibility standard to instrumental equivalents, which are "extinction of 0.23 per kilometer" and "extinction of 0.07 per kilometer" for the statewide and Lake Tahoe Air Basin standards, respectively.

Greenhouse Gases and Climate Change

The USEPA has not set National Ambient Air Quality Standards for carbon dioxide and similar "greenhouse gases" (GHGs). See EPA's climate change web site: http://www.epa.gov/climatechange/.

GHGs are not criteria pollutants under the California Clean Air Act, and ambient air quality standards have not been set. Based on legislation and Governor's executive orders, they are regulated by the California Air Resources Board (CARB). For more information on CARB's climate change program see: http://www.arb.ca.gov/cc/cc.htm.

Climate change is analyzed in Chapter 4—California Environmental Quality Act Evaluation. Neither the United States Environmental Protection Agency (USEPA) nor the Federal Highway Administration (FHWA) has promulgated explicit guidance or methodology to conduct project-level greenhouse gas analysis. As stated on FHWA's climate change website (http://www.fhwa.dot.gov/hep/climate/index.htm), climate change considerations should be integrated throughout the transportation decision-making process—from planning through project development and delivery. Addressing climate change mitigation and adaptation up front in the planning process would facilitate decision-making and improve efficiency at the program level, and would inform the analysis and stewardship needs of project level decision-making. Climate change considerations can easily be integrated into many planning factors, such as supporting economic vitality and global efficiency, increasing safety and mobility, enhancing the environment, promoting energy conservation, and improving the quality of life.

Because there have been more requirements set forth in California legislation and executive orders regarding climate change, the issue is addressed in the California Environmental Quality Act chapter of this environmental document and may be used to inform the National Environmental Policy Act decision. The four strategies set forth by FHWA to lessen climate change impacts do correlate with efforts that the State has undertaken and is undertaking to deal with transportation and climate change. The strategies include improved transportation system efficiency, cleaner fuels, cleaner vehicles, and reduction in the growth of vehicle hours traveled.

Federal

The 1990 CAA Amendments require that each state have an air pollution control plan called the State Implementation Plan (SIP). The SIP, which is reviewed by the Environmental Protection Agency (USEPA), includes strategies and control measures to attain the national ambient air quality standards by deadlines established in the CAA. The Environmental Protection Agency reviews the SIP to determine if the plan would conform to the 1990 CAA Amendments and achieve the CAA air quality goals. As described later in this chapter, federally funded transportation projects (such as the proposed project) must be included in regional transportation plans that achieve the air quality goals of the SIP. Plans may also include interim milestones for progress toward attainment.

The USEPA has classified air basins (or portions thereof) as being in “attainment,” “non-attainment,” or “unclassified” for each criteria air pollutant, based on whether or not the national ambient air quality standards have been achieved. The USEPA classifies the North Coast Air Basin as being in attainment or unclassified for all criteria pollutants. When an air basin is defined as “unclassified,” typically these areas are not considered to have air quality problems (e.g., sparsely populated areas). The project, however, is located in an air basin that is not in attainment for particulate matter pursuant to State air quality standards.

The USEPA signed the final rule on February 23, 2006 which established requirements for project-level conformity determinations for particulate matter 2.5 microns diameter or less ($PM_{2.5}$) non-attainment and maintenance areas. This final rule is part of EPA’s implementation of the current $PM_{2.5}$ standards. This rule requires that $PM_{2.5}$ “hot spot” analyses are included in project-level conformity determinations only for new transportation projects with significant diesel traffic, such as major highway projects and projects at congested intersections that handle significant diesel traffic. In general, hot spots are localized areas at which pollutants exceed the National Ambient Air Quality Standards (NAAQS). PM_{10} is required to be considered and evaluated on a local impact basis for projects of air quality concern.

Under National Ambient Air Quality Standards, Humboldt County is designated as unclassified/attainment for all transportation-related criteria pollutants (CO, Ozone, $PM_{2.5}$ and PM_{10}). Under California Ambient Air Quality Standards, it is designated as attainment for CO $PM_{2.5}$, and Ozone, and non-attainment for PM_{10}. This project does not meet the definition of a “project of air quality concern”. A project of air quality concern is defined by the final rule of 40CFR 93.123(b)(1) as:

“…(i) New or expanded highway projects that have a significant number of, or significant increase in diesel vehicles;

(ii) Projects affecting intersections that are at Level of Service D, E, or F with a significant number of diesel vehicles, or those that will change to Level of Service D, E, or F because of increased traffic volumes from a significant number of diesel vehicles related to the project;…”

The CEQ issued guidance on greenhouse gasses and climate change in August 2016. However, it does not apply to this project because it is a longstanding project where the environmental analysis was substantially complete.

State and Local

The CARB regulates mobile emissions sources and oversees the activities of county and regional air quality management districts. The CARB regulates local air quality indirectly by establishing vehicle emission standards through its planning, coordinating, and research activities. California has adopted ambient standards that are generally more stringent than the national standards for the criteria air pollutants (see Table 3-16). Under the CCAA, which was patterned after the federal CAA, areas are designated as being in "attainment," in "non-attainment," or "unclassified," with respect to the state ambient air quality standards. The CCAA requires that districts design a plan to achieve an annual reduction of five percent or more in district-wide emissions for each non-attainment criteria pollutant or its precursor(s). The CARB has designated the North Coast Air Basin as non-attainment for the State PM_{10} standards and attainment or unclassified (see earlier discussion) for all other criteria pollutants (see Table 3-16).

PM_{10} consists of particles in the atmosphere resulting from many sources, including fume producing industrial and agricultural operations, motor vehicle tire wear, fossil fuel combustion, atmospheric photochemical reactions, burned agriculture waste, construction activities, and wind-raised dust. Current standards apply to concentrations of particles that are smaller than ten micrometers in diameter, which are referred to as PM_{10}. In May 1995, NCUAQMD adopted its Particulate Matter (PM_{10}) Attainment Plan, which includes measures to reduce PM_{10} emissions from mobile sources, wood stoves, and other combustion sources. This area is not in attainment of the State PM_{10} standards.

The NCUAQMD has jurisdiction over air quality in the North Coast Air Basin and regulates most air pollutant sources, except for motor vehicles, locomotives, aircraft, agriculture equipment, and marine vessels. The NCUAQMD, along with the CARB, maintains ambient air quality monitoring stations at numerous locations throughout the air basin to measure criteria pollutant levels.

Transportation Conformity

Transportation projects receiving federal funding or approval must be found to conform to the current SIP. Each region in the State submits to the CARB its emissions budgets and strategies for reducing air emissions of air pollutants that are above national ambient air quality standards. The CARB prepares the SIP.

Transportation planning is coordinated with this "conformity" process. The Regional Transportation Plan (RTP) contains a long-range plan for transportation projects and emissions budgets for those projects within the jurisdiction of a local regional transportation agency, which in this case is the Humboldt County Association of Governments. The RTP must conform to the SIP by having an emissions budget from its planned projects that does not exceed the emissions budget in the SIP. However, this project is located within an area that is in attainment for all Federal criteria pollutants, thus conformity does not apply.

Coordination with North Coast Unified Air Quality Management District

Humboldt County is included in the North Coast Air Basin along with Del Norte, Trinity and Mendocino counties. These counties operate as a unified special district, also called the North Coast Unified Air Quality Management District (NCUAQMD), which manages air resources in this mountainous, predominantly rural region.

Most major air pollutants in Humboldt County—especially for mobile sources—are well below levels that the state considers harmful. Sources of ozone precursor emissions are low enough that ozone smog does not rise to substantial levels, even during periods of minimal air movement. The entirety of the North Coast Air Basin has been designated as "attainment" or "unclassified" for all criteria pollutants (carbon monoxide, ozone, sulfur oxides, and nitrogen dioxide) and is subject to "Prevention of Significant Deterioration" (PSD) permit procedures. Except for Redwood National Park, which is designated Class I, all of Humboldt County is designated as a Class II area.

Long term impacts on regional air quality are projected to increase at a slower rate than in the past, due to conversion to more efficient and lower emission vehicles, RTP plan policies and actions encouraging public transit use and conversion of transit vehicles to alternative fuels, and programs and improvements designed to increase bicycle and pedestrian system use. In 2014, Humboldt County Association of Governments (HCAOG) updated a 20 year Humboldt Regional Transportation Plan. The updated plan is known as the Variety in Rural Options of Mobility (VROOM). The goal of VROOM is to make the transportation system operate more efficiently by reducing traffic congestion and using Intelligent Transportation Systems (ITS) management (e.g., Greater Eureka Area Travel Demand Model, Street Saver) financially and operationally viable by prioritizing cost-effective investments, pursuing stable funding, and preserving transportation assets to maximize resources and future use). *(Source: HCAOG, 2014)*

NOTE: For climate change and greenhouse gas discussion, refer to Chapter 4—California Environmental Quality Act (CEQA) Evaluation.

AFFECTED ENVIRONMENT

Climate, Meteorology, Asbestos, and Topography

The topography of the project area is generally flat and close to sea level in elevation. The project area is located adjacent to Arcata Bay, which is the northern portion of Humboldt Bay. There is no substantial topographical barrier separating the project area from the Pacific Ocean, approximately 3.1 miles west. The land slopes gently upward from Humboldt Bay toward the Coast Range approximately 0.5-mile east of the project area, reaching the top of its first ridge approximately 6 miles to the east. This ridge extends in an approximate semicircle from a point 20 miles north of Eureka to a point 25 miles south.

The climate of the project area is predominately ocean influenced. Though there are definite rainy and dry seasons, high humidity exists throughout the year. The rainy season lasts from October through April accounting for about 90 percent of the annual precipitation. The dry season, lasting from May through September, is typically marked by intrusions of low clouds and fog during nights, mornings, and evenings, and sunny afternoons. Because of the proposed project's proximity to Arcata Bay, the project area may remain foggy or overcast throughout the day. The proximity of the project area to the Pacific Ocean and the prevailing northwest winds, which blow across the cold upwelling water that is generally present off the coast of Humboldt County, keeps temperatures moderate. Colder lows are in the mid-30s (Fahrenheit) and the warmer highs in the mid-70s.

Naturally occurring asbestos is known to occur in some serpentine rock and ultramafic rock in California. Exposing or disturbing these rocks can release this toxic material and potentially expose the public. There is no ultramafic rock or serpentine rock located in the vicinity of the proposed project.

Existing Air Quality

Air quality in the North Coast Air Basin is a function of the criteria pollutants that are emitted locally, the existing regional ambient air quality, and meteorological and topographic factors. In general, the frequently strong northwest winds are very effective in dispersing airborne pollutants. However, during summer months, atmospheric temperature inversions are common, and this limits vertical air pollutant dispersion. Overall, the land use (not heavily urbanized) and the persistent coastal winds keep air pollutant levels low. A five-year summary of $PM_{2.5}$ and PM_{10} (particulate matter less than 2.5 and 10 microns in size) in the project area is provided in Table 3-17.

Table 3-17 $PM_{2.5}$ and PM_{10} 5-Year Summary					
Except for days of exceedance, values in this table are expressed in micrograms per cubic meter (μg/m^3)					
$PM_{2.5}$ (Particulate matter less than 2.5 microns in size)	**2009**	**2010**	**2011**	**2012**	**2013**
Estimate days > National 24 hour standard[1]	0	0	0	*	0
National annual average[2]	6.6	5.4	6.2	*	6.7
State annual average[3]	6.6	5.4	*	*	6.7
National 24-hour average maximum[4]	30.3	21.8	19.7	18	24.3
State 24-hour average maximum[5]	30.3	21.8	19.7	18	24.3
PM_{10} (Particulate matter less than 10 microns in size)					
Estimate days > National 24 hour standard[6]	0	0	0	0	0
Estimated days > State 24 hour standard[7]	6.1	6.0	6.1	*	14.9
State annual average[8]	18.8	19.0	20.3	*	19.7
State 3 year annual average[9]	22	22	20.3	20	20
National 24 hour maximum average[10]	54.9	64.5	48.1	44.3	64.3
State 24 hour maximum average[11]	58.1	67.3	52.3	48.9	66.7

(Source: CARB, 2015)
Measurements recorded at the I Street monitoring station in Eureka

NOTES:

* Means there was insufficient data available to determine the value.

[1]The "Estimated Days Over the National 24-Hour $PM_{2.5}$ Standard" is the estimated number of days in the year that the national 24-hour $PM_{2.5}$ standard would have been *exceeded* had sampling occurred every day of the year. Sampling can occur every day, once every 3 days, once every 6 days, or any combination of these frequencies. The national $PM_{2.5}$ 24-hour standard is 35 micrograms per cubic meter.

[2]The "National Annual Average" for $PM_{2.5}$ is the average of the year's quarterly averages, calculated according to the method specified in Title 40, Part 50, Appendix N of the Code of Federal Regulations as it appeared on October 17, 2006. The national annual standard is *exceeded* when the National Annual Average is greater than 15 micrograms per cubic meter and is *violated* when the National Annual Standard Design Value is greater than 15 micrograms per cubic meter.

[3]The "State Annual Average" for $PM_{2.5}$ is the average of the year's quarterly averages. The California annual standard is *exceeded* when the State Annual Average is greater than 12 micrograms per cubic meter and is *violated* when the State Annual Standard Designation Value (the highest state annual average for three consecutive years) is greater than 12 micrograms per cubic meter.

[4]The "National High 24-Hour $PM_{2.5}$ Average" is the highest nationally valid daily 24-hour $PM_{2.5}$ average observed within the year, expressed in micrograms per cubic meters. A national 24-hour average may be based on single midnight-to-midnight observation or on the average of all hourly observations within a calendar day, provided the method used to collect the observation(s) is a national reference or equivalent method. The national 1997 24-hour standard is *exceeded* when a national 24-hour average, after being rounded to the nearest microgram per cubic meter, is greater than 65 micrograms per cubic meter. The national 1997 24-hour standard is *violated* when the National 24-Hour Standard Design Value is greater than 65. On October 17, 2006, the US Environmental Protection Agency adopted a new 24-hour $PM_{2.5}$ standard (but left the 1997 standard in place). The national 2006 24-hour standard is *exceeded* when a national 24-hour average, after being rounded to the nearest microgram per cubic meter, is greater than 35 micrograms per cubic meter. The national 2006 24-hour standard is *violated* when the National 24-Hour Standard Design Value is greater than 35.

[5]The "State High 24-Hour $PM_{2.5}$ Average" is the highest California-valid daily 24-hour $PM_{2.5}$ average observed within the year, expressed in micrograms per cubic meters. A California-valid daily 24-hour average may be based on single midnight-to-midnight observation or on the average of all hourly observations within a calendar day, provided that the observation (or observations) was made with a California Approved Sampler.

[6]The "Estimated Days Over the National 24-Hour PM_{10} Standard" is the estimated number of days in the year that the national 24-hour PM_{10} standard would have been *exceeded* had sampling occurred every day of the year. Sampling typically occurs once every 6 days. National PM_{10} statistics are based on standard-conditions data. The national 24-hour PM_{10} standard is 150 micrograms per cubic meter.

[7]The "Estimated Days Over the State 24-Hour PM_{10} Standard" is the estimated number of days in the year that the California 24-hour PM_{10} standard would have been *exceeded* had sampling occurred every day of the year. Sampling typically occurs once every 6 days. State PM_{10} statistics are based on local-conditions data. The California 24-hour PM_{10} standard is 50 micrograms per cubic meter.

[8]The "State Annual Average" for PM_{10} is the average of the year's quarterly averages of local-conditions measurements. The California annual standard is *exceeded* when the highest state annual average for three consecutive years is greater than 20 micrograms per cubic meter.

[9]The "State 3-Year PM_{10} Average" is the highest of three consecutive state annual PM_{10} averages, including the state annual PM_{10} averages for the listed year and the two years before then. The state annual PM_{10} standard is *exceeded* when the state 3-year average is greater than 20 micrograms per cubic meter.

[10]The "National Maximum 24-Hour PM_{10} Average" is the highest standard-conditions 24-hour PM_{10} average observed within the year, expressed in micrograms per cubic meters. A national 24-hour average may be based on single midnight-to-midnight observation or on the average of all hourly observations within a calendar day, provided the method used to collect the observation(s) is a national reference or equivalent method. The national 24-hour standard is *exceeded* when a national 24-hour average, after being rounded to the nearest 10 micrograms per cubic meter, is greater than 150 micrograms per cubic meter. The national 24-hour standard is *violated* when the sum of the national estimated number of exceedances over three years is greater than 3.

[11]The "State Maximum 24-Hour PM_{10} Average" is the highest local-conditions 24-hour PM_{10} average observed within the year, expressed in micrograms per cubic meters. A California 24-hour average may be based on single midnight-to-midnight observation or on the average of all hourly observations within a calendar day, provided that the observation(s) was made with a California Approved Sampler. The state 24-hour standard is *exceeded* when a California 24-hour average is greater than 50 microgram per cubic meter.

ENVIRONMENTAL CONSEQUENCES

Potential air quality impacts from the proposed project would result from two activities associated with the project: construction of the proposed project and vehicular use (operation) of the proposed project after construction is completed. Impacts associated with construction would be short-term, temporary adverse effects, while the post construction effects from traffic would be minimal. The following sections discuss these findings.

Mobile Source Air Toxics Effects

Mobile source air toxics (MSATs) are compounds emitted from highway vehicles and non-road equipment. Some toxic compounds are present in fuel and are emitted to the air when the fuel evaporates or passes through the engine unburned. Other toxics are emitted from the incomplete combustion of fuels or as secondary combustion products. Metal air toxins also result from engine wear or from impurities in oil or gasoline.

Controlling air toxic emissions became a national priority with the passage of the Clean Air Act Amendments (CAAA) of 1990, whereby Congress mandated that the U.S. EPA regulate 188 air toxics, also known as hazardous air pollutants (HAPs). EPA has assessed this expansive list in their latest rule on the Control of Hazardous Air Pollutants from Mobile Sources (Federal Register, Vol. 72, No. 37, page 8430, February 26, 2007) and identified a group of 93 compounds emitted from mobile sources that are listed in their Integrated Risk Information System (IRIS). In addition, the EPA identified seven compounds with significant contributions from mobile sources that are among the national and regional-scale cancer risk drivers from their 1999 National Air Toxics Assessment (NATA). These are acrolein, benzene, 1,3-butadiene, diesel particulate matter including diesel exhaust organic gases (DPM), formaldehyde, naphthalene, and polycyclic organic matter. While FHWA considers these the priority mobile source air toxics, the list is subject to change and may be adjusted in consideration of future EPA rules. The 2007 EPA rule mentioned above requires controls that will dramatically decrease MSAT emissions through cleaner fuels and cleaner engines.

The EPA has adopted rules intended to reduce emissions from heavy-duty engines (both on and off road engines) and control the amount of sulfur in diesel (Federal Register, Vol. 66, No. 12, page 5002, 192pp, January 18, 2001). EPA's 2007 rule to reduce hazardous air pollutants from mobile sources (Control of Hazardous Air Pollutants from Mobile Sources, February 26, 2007) limits the benzene content of gasoline and reduces toxic emissions from passenger vehicles. The 2007 EPA rule mentioned above requires controls that will dramatically decrease MSAT emissions through cleaner fuels and cleaner engines.

California's vehicle emission control and fuel standards are more stringent than Federal standards. CARB found that DPM contributes over 70% of the known risk from air toxics and poses the greatest cancer risks among all identified air toxics. Diesel trucks contribute more than half of the total diesel combustion sources. In response, CARB adopted a Diesel Risk Reduction Plan (DRRP) with control measures to reduce the overall DPM emissions by about 85% from 2000 to 2020. Part of the plan included recently adopted regulation that requires operators of truck and bus fleets in California to retrofit or replace vehicles to meet U.S. EPA NOx and PM2.5 emission standards for 2010 model trucks (13 C.C.R. section 2025). Implementation of this regulation began in 2014. By 2023, nearly all trucks and buses operating in California will need to have 2010 model year engines or equivalent.

According to an FHWA analysis that uses EPA's MOVES2010b model, even if vehicle activity increases by 102 percent as assumed from 2010 to 2050, a combined reduction of 83 percent in the total annual emission rate for the priority MSAT is projected for the same period. The combined State and Federal regulations are expected to result in greater emission reductions, more quickly, than the FHWA analysis indicates.

FHWA has issued Interim Guidance on Air Toxic Analysis in NEPA Documents (December 6, 2012). In this guidance, FHWA identified three levels of analysis:

1. No analysis for projects with no potential for meaningful MSAT effects;
2. Qualitative analysis for projects with low potential MSAT effects; or
3. Quantitative analysis to differentiate alternatives for projects with higher potential MSAT effects.

The purpose of this project includes enhancing safety, improving intersection level-of-service or LOS[19], and extending the serviceable life of the Route 101 roadway and intersections between Eureka and Arcata by constructing various improvements (refer to Chapter 2 for more information). Improving Route 101 intersection LOS would reduce emission of volatile organic compound (VOC)-based MSATs (benzene, formaldehyde, acetaldehyde, acrolein, and 1,3-butadiene). The LOS benefit may be offset somewhat by increased vehicle miles traveled, since out-of-direction travel would result from Route 101 median access closures. (Refer to Chapter 3, Section 3.1.6 Traffic and Transportation for more information.)

For each alternative in this Final EIR/S, the net increase of MSAT emitted would result from the net increase of vehicle miles traveled (VMT). All of the Build Alternatives would have higher VMT than that for the No-Build Alternative because uncontrolled left turn movements would be eliminated, causing out-of-direction travel. (Other variables such as the proportion of passenger vehicles, buses, and commercial trucks traveling on Route 101 are the same for each alternative.) Alternative 1 would have the highest VMT of the alternatives since the out-of-direction travel could be as high as 10 miles for round trips originating at Airport Road and traveling to the Eureka urban area. In addition, round trips from the heaviest traveled local road, Indianola Cutoff, to Eureka or Arcata would require 4.9 or 6.3 miles of out-of-direction travel. Alternatives 1A, 2, 3, and Modified Alternative 3A would have substantially less collective out-of-direction travel (and VMT) because these alternatives have either grade separations, signals, or

[19] See Appendix B for an explanation of LOS.

turnarounds that would minimize out-of-direction travel at the most heavily traveled intersections. (Refer to Chapter 3, Section 3.1.6 Traffic and Transportation for more information.) The MSAT emissions increase from out-of-direction travel is offset somewhat by lower MSAT emission rates from improved intersection LOS as a result of the closure of Route 101 median crossings. Also, regardless of the alternative chosen, emissions will likely be lower than present levels in the design year as a result of EPA's national control programs that are projected to reduce annual MSAT emissions by over 80 percent between 2010 and 2050. Local conditions may differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures. However, the magnitude of the EPA-projected reductions is so great (even after accounting for VMT growth) that MSAT emissions in the study area are likely to be lower in the future in nearly all cases.

The Route 101 through traffic lanes would not be realigned closer to residences and businesses. However, all project alternatives include some combination of extending Route 101 acceleration and deceleration lanes, constructing interchange ramps, modifying the Route 101/Airport intersection, or constructing turnarounds (Alternative 1A only). These improvements would result in aligning traffic slightly closer (approximately 1 to 2 feet) to the residences near Airport Road. The closest individual dwellings within the mobile home park on Jacobs Avenue are approximately 90 feet from the existing Route 101 traveled way. Overall, under each alternative there may be localized areas where ambient concentrations of MSAT could be higher under certain Build Alternatives than the No-Build Alternative. The localized increases in MSAT concentrations would likely be most pronounced along the expanded roadway sections that would be built at and near the businesses at the following Route 101 intersections: Airport Road, Mid-City Motor World, California Redwood Company, Indianola Cutoff, and Bracut. However, the magnitude and the duration of these potential increases compared to the No-Build alternative cannot be reliably quantified due to incomplete or unavailable information in forecasting project-specific MSAT health impacts. In summary, when a highway is widened, the localized level of MSAT emissions for the Build Alternative could be higher relative to the No-Build Alternative, but this could be offset by reductions in congestion at intersections (which are associated with lower MSAT emissions). Also, on a regional basis, EPA's vehicle and fuel regulations, coupled with fleet turnover, will over time cause substantial reductions that, in almost all cases, will cause region-wide MSAT levels to be significantly lower than today.

Incomplete or Unavailable Information for Project Level MSAT Analysis

In FHWA's view, information is incomplete or unavailable to credibly predict the project-specific health impacts due to changes in MSAT emissions associated with a proposed set of highway alternatives. The outcome of such an assessment, adverse or not, would be influenced more by the uncertainty introduced into the process through assumption and speculation rather than any genuine insight into the actual health impacts directly attributable to MSAT exposure associated with a proposed action.

The U.S. Environmental Protection Agency (EPA) is responsible for protecting the public health and welfare from any known or anticipated effect of an air pollutant. They are the lead authority for administering the Clean Air Act and its amendments and have specific statutory obligations with respect to hazardous air pollutants and MSAT. The EPA is in the continual process of assessing human health effects, exposures, and risks posed by air pollutants. They maintain the Integrated Risk Information System (IRIS), which is "a compilation of electronic reports on specific substances found in the environment and their potential to cause human health effects" (EPA, https://www.epa.gov/iris/). Each report contains assessments of non-cancerous and cancerous effects for individual compounds and quantitative estimates of risk levels from lifetime oral and inhalation exposures with uncertainty spanning perhaps an order of magnitude.

Other organizations are also active in the research and analyses of the human health effects of MSAT, including the Health Effects Institute (HEI). Two HEI studies are summarized in Appendix D of FHWA's Interim Guidance Update on Mobile source Air Toxic Analysis in NEPA Documents. Among the adverse health effects linked to MSAT compounds at high exposures are; cancer in humans in occupational settings; cancer in animals; and irritation to the respiratory tract, including the exacerbation of asthma. Less obvious is the adverse human health effects of MSAT compounds at current environmental concentrations (HEI, http://pubs.healtheffects.org/view .php?id=282) or in the future as vehicle emissions substantially decrease (HEI, http://pubs.healtheffects.org/view.php?id=306).

The methodologies for forecasting health impacts include emissions modeling; dispersion modeling; exposure modeling; and then final determination of health impacts – each step in the process building on the model predictions obtained in the previous step. All are encumbered by technical shortcomings or uncertain science that prevents a more complete differentiation of the MSAT health impacts among a set of project alternatives. These difficulties are magnified for lifetime (i.e., 70 year) assessments, particularly because unsupportable assumptions would have to be made regarding changes in travel patterns and vehicle technology (which affects emissions rates) over that time frame, since such information is unavailable.

It is particularly difficult to reliably forecast 70-year lifetime MSAT concentrations and exposure near roadways; to determine the portion of time that people are actually exposed at a specific location; and to establish the extent attributable to a proposed action, especially given that some of the information needed is unavailable.

There are considerable uncertainties associated with the existing estimates of toxicity of the various MSAT, because of factors such as low-dose extrapolation and translation of occupational exposure data to the general population, a concern expressed by HEI (http://pubs.health effects.org/view.php?id=282). As a result, there is no national consensus on air dose-response values assumed to protect the public health and welfare for MSAT compounds, and in particular for diesel PM. The EPA (http://www.epa.gov/risk/basicinformation.htm#g) and the HEI (http://pubs.healtheffects.org/getfile.php?u=395) have not established a basis for quantitative risk assessment of diesel PM in ambient settings.

There is also the lack of a national consensus on an acceptable level of risk. The current context is the process used by the EPA as provided by the Clean Air Act to determine whether more stringent controls are required in order to provide an ample margin of safety to protect public health or to prevent an adverse environmental effect for industrial sources subject to the maximum achievable control technology standards, such as benzene emissions from refineries. The decision framework is a two-step process. The first step requires EPA to determine an “acceptable” level of risk due to emissions from a source, which is generally no greater than approximately 100 in a million. Additional factors are considered in the second step, the goal of which is to maximize the number of people with risks less than 1 in a million due to emissions from a source. The results of this statutory two-step process do not guarantee that cancer risks from exposure to air toxics are less than 1 in a million; in some cases, the residual risk determination could result in maximum individual cancer risks that are as high as approximately 100 in a million. In a June 2008 decision, the U.S. Court of Appeals for the District of Columbia Circuit upheld EPA’s approach to addressing risk in its two step decision framework. Information is incomplete or unavailable to establish that even the largest of highway projects would result in levels of risk greater than deemed acceptable.

Because of the limitations in the methodologies for forecasting health impacts described, any predicted difference in health impacts between alternatives is likely to be much smaller than the uncertainties associated with predicting the impacts. Consequently, the results of such assessments would not be useful to decision makers, who would need to weigh this information against project benefits, such as reducing traffic congestion, accident rates, and fatalities plus improved access for emergency response, that are better suited for quantitative analysis.

The 2007 EPA rule mentioned earlier requires controls that dramatically decrease MSAT emissions through cleaner fuels and cleaner engines. According to an FHWA analysis using EPA's MOVES2010b, even if vehicle activity (vehicle-miles traveled, VMT) increases (statewide) by 102 percent as assumed from 2010 to 2050, a combined reduction of 83 percent in the total annual emission for the priority MSAT is projected for the same time period *(Source: United States Department of Transportation, Federal Highway Administration, 2012).*

Traffic-Related Carbon Monoxide Effects

California’s carbon monoxide (CO) air quality standards would be violated if a change in traffic patterns related to the proposed project caused a localized increase in carbon monoxide concentrations that exceeded California’s ambient air quality standards. Potential localized CO air quality impacts were analyzed for the proposed project. The procedures in *Transportation Project-Level Carbon Monoxide Protocol*, prepared by the University of California, Davis, Institute of Transportation Studies, were used to analyze CO impacts. This protocol describes different screening procedures, based on the attainment status of the area in which the project is planned, that can be used to evaluate potential CO impacts of the project and assess the need to perform localized CO air quality impact modeling.

For projects in CO attainment areas (such as the proposed project), the first level of analysis outlined by the CO Protocol is to determine if the project would lead to an increase in CO emissions. Comparing the following traffic variables between the Build Alternatives and No-Build Alternative forms the basis to make a determination:

- None of the Build Alternatives would increase the percentage of vehicles operating in cold-start mode (a phase of engine operation that produces a higher proportion of air pollutants) by more than two percent over the No-Build Alternative.
- None of the Build Alternatives would increase traffic volumes in excess of five percent over the No-Build Alternative.
- None of the Build Alternatives would cause a decrease in traffic speeds.
- The Build Alternatives would improve traffic flow over the No-Build Alternative.
- None of the Build Alternatives would align traffic substantially closer to buildings or sidewalks.

If any of the Build Alternatives do not satisfy all of the above criteria, then that particular alternative could potentially cause an increase in CO emissions over the No- Build Alternative. For project Alternatives that potentially cause an increase in CO emissions above the No-Build Alternative, the CO Protocol describes a comparative analysis between a current roadway ("worst case roadway") in an area demonstrating CO attainment and the proposed project. This comparative analysis is intended to assess the potential of higher CO concentrations at the worst-case roadway with the proposed project. If the worst-case roadway is demonstrated to have higher CO concentrations than the proposed project, the conclusion can be made that the proposed project would not lead to a violation of CO standards since the worst-case roadway does not cause a violation in CO standards. The CO emissions from the proposed project would not cause a violation of the CO standards if the following criteria were satisfied:

- Representative residence locations are the same distance or farther from the proposed project than the residence locations at the worst-case roadway in the attainment area.
- The proposed project traffic volumes are the same or lower than those of the worst-case roadway.
- Assumed meteorology for the proposed project is the same or better than that for the worst-case roadway.
- Percentage of vehicles operating in cold-start mode is the same or lower for the proposed project when compared to the worst-case roadway in the attainment area.
- Percentage of heavy-duty gas trucks for the proposed project would not be greater than that for the worst-case roadway.

- Background CO concentrations in the proposed project area are the same or lower than that in the area of the worst-case roadway.

If the proposed project satisfies the above conditions, it would not lead to a violation of the CO standards. This conclusion can be made because the worst-case roadway currently existing in an attainment area does not cause CO concentrations to exceed ambient air quality standards, and the proposed project's CO concentrations would be lower than the worst case roadway's CO concentrations. The impact would not be considered substantial and no further analysis, such as a micro scale CO model, would be required.

Carbon Monoxide Emission Assessment Methodology

Comparison of the Build Alternatives and the No-Build Alternative showed that Alternatives 1, 2, and 3 would result in an increase in carbon monoxide (CO) emissions over the No-Build Alternative. CO predictions were not made for Alternative 1A and Modified Alternative 3A, but they would be no greater than Alternatives 1, 2, or 3 since they are very similar. Several affected roadway segments of Old Arcata Road, Myrtle Avenue, State Route 255, and highway segments of Route 101 for these Build Alternatives would experience traffic volume increases greater than five percent over the No-Build Alternative, projected for the year 2041. (Old Arcata Road makes a transition to Myrtle Avenue in the Eureka area.) Additionally, Indianola Cutoff would experience over a forty percent increase in traffic volumes for Build Alternatives 2, 3, and Modified Alternative 3A over the No-Build Alternative. By not satisfying these criteria of the CO Protocol described previously, these Build Alternatives have demonstrated that they would result in an increase in CO emissions over the No-Build Alternative. Therefore, the comparative analysis with worst-case roadways, described above, was necessary to assess CO impacts for all Build Alternatives.

To conduct the comparative analysis with a worst-case roadway, the intersection and Route 101 mainline sections (excluding ramps, frontage roads, etc.) of the proposed project with the potential to produce the highest CO concentrations for any Build Alternative were selected. For this analysis, if the intersection and mainline sections were shown to not produce a violation in the CO standards, then all intersections and mainline segments for all of the Build Alternatives would not violate the CO standards.

Based on traffic model projections, the intersection of Old Arcata Road (Myrtle Avenue) and Freshwater-Kneeland Road, under Alternative 1, would be the intersection to have the highest potential CO levels resulting from any of the Build Alternatives. High CO levels would be expected based on the projected (poor) LOS "F" and high traffic volumes. This intersection of the proposed project was compared to a worst-case intersection. The intersection of Route 101 and Henderson Street in Eureka would qualify as a worst case intersection because it meets the criteria outlined in the CO Protocol and reiterated previously in this section. The average daily (24 hour) count for this segment of Route 101 at Henderson Street in Eureka was 36,000 vehicles per day in 2005[20] *(Source: 2005 Traffic Volumes on California State Highways, no date).*

The mainline (through traffic lanes) section of Route 101 between Indianola and Cole Avenue, under Alternative 2, would have the highest mainline traffic volumes and would therefore have the highest potential CO concentrations of any mainline roadway segment for any of the Build Alternatives. Therefore, Route 101 between Indianola and Cole Avenue would be the mainline section of the proposed project compared to a worst case mainline. The mainline roadway segment of Route 101 at Fourth Street in Santa Rosa (worst case mainline) would qualify as a worst-case roadway because it meets the criteria outlined in the CO Protocol and reiterated in the above Methodology section. The average daily (24 hour) count for this segment of Route 101 in Santa Rosa was 121,000 vehicles per day in 2005[21].

Although traffic forecast data is reflective of data obtained in 2005, the District 1 Traffic Operations has verified that the projected traffic volumes used throughout the FEIR/S for the Eureka-Arcata Improvement project have been statistically close to the values that are published annually by Caltrans in the Traffic Volumes on California State Highways and to actual traffic volumes measured in the field. This validates that the traffic projections (based upon initial traffic count data taken in 2005) used in the EIR and in the air pollution calculations are appropriate and valid for the environmental document.

Although there are closer locations to the proposed project area than Santa Rosa that would qualify as a worst-case roadway for most of the comparison criteria listed above, Route 101 in Santa Rosa at Fourth Street is the closest highway segment that meets all the comparison criteria (described in more detail below). It is the closest mainline roadway segment that has current traffic volumes equal to or greater than the forecasted volumes for the proposed project mainline roadway segment in the year 2041. The land use projections used to calculate the 2041 traffic volumes for the proposed project show a large increase in traffic volumes compared to current traffic volumes in the project area. These projected traffic volumes would be higher than existing traffic volumes along Route 101 north of Santa Rosa. Therefore, Route 101 at Fourth Street in Santa Rosa was the most appropriate worst-case roadway segment.

[20] A consultant prepared the original air quality study for the EIR/S in 2006 using year 2005 traffic volumes. The year 2005 traffic volume on Route 101 in Eureka is still applicable for comparison purposes in this study since it was more than the projected traffic volume on Old Arcata Road (at Freshwater) for the year 2041.

[21] A consultant prepared the original air quality study for the EIR/S in 2006 using year 2005 traffic volumes. The year 2005 traffic volume on Route 101 in Santa Rosa is still applicable for comparison purposes in this study since it was more than twice the projected traffic volume on Route 101 within the Eureka-Arcata Corridor for the year 2041.

Mainline Analysis

The worst case mainline is located in downtown Santa Rosa, where the highway is adjacent to potential receptors (buildings, sidewalks). The closest receptors to Route 101 between Indianola Cutoff and Cole Avenue are approximately 130-feet from the roadway. The design of Route 101 between Indianola Cutoff and Cole Avenue would not allow for receptors to be as close to it as Route 101 in Santa Rosa, because Route 101 between Indianola and Cole Avenue is not an elevated structure that can be directly adjacent to receptors. Therefore, the receptor locations are closer to Route 101 in Santa Rosa than those projected to be adjacent to Route 101 between Indianola Cutoff and Cole Avenue based on planned land uses. The year 2005 traffic volumes on Route 101 in Santa Rosa were more than double the 2041 projected traffic volumes for Route 101 between Indianola Cutoff and Cole Avenue.

The meteorological conditions of Route 101 in Santa Rosa are somewhat similar to those for Route 101 between Indianola Cutoff and Cole Avenue. Wind patterns are relatively similar on Route 101 between Indianola Cutoff and Cole Avenue and Route 101 in Santa Rosa. The minimum temperatures are lower at Route 101 in Santa Rosa, which would lead to higher CO emissions and concentrations. Therefore, meteorologically, there is a greater probability for CO concentrations to be higher at Route 101 in Santa Rosa than at Route 101 between Indianola Cutoff and Cole Avenue.

The percentage of vehicles operating in cold-start mode is not expected to be substantially different for Route 101 between Indianola Cutoff and Cole Avenue than that for Route 101 in Santa Rosa. At maximum, each can expect 10-15 percent of vehicles operating in a cold-start mode according to the *Transportation Project-Level Carbon Monoxide Protocol*, prepared by the University of California, Davis, Institute of Transportation Studies.

The percentage of heavy-duty gas trucks would be similar at Route 101 between Indianola Cutoff and Cole Avenue and Route 101 in Santa Rosa.

Background CO concentrations would be higher at Route 101 in Santa Rosa than at Route 101 between Indianola Cutoff and Cole Avenue because the land uses surrounding Route 101 in Santa Rosa are denser than the predicted land uses surrounding Route 101 between Indianola Cutoff and Cole Avenue.

Route 101 between Indianola Cutoff and Cole Avenue, under Alternatives 2, 3, and Modified Alternative 3A, which was predicted to have higher mainline daily traffic volumes than Alternative 1, satisfies the comparison analysis conditions listed above and would not contribute to an exceedance of CO emission standards. Therefore, no mainline roadway section affected by the proposed project for any one of the Build Alternatives would lead to a violation of the CO standards.

Intersection Analysis

Receptor locations are as close or closer to the intersection of Route 101 and Henderson Street than those projected to be adjacent to the intersection of Myrtle Avenue and Freshwater-Kneeland Road. Peak hour traffic volumes at the intersection of Route 101 and Henderson Street are approximately three times greater than those projected at the intersection of Myrtle Avenue and Freshwater-Kneeland Road.

The meteorological conditions of the intersection of Route 101 and Henderson Street are the same as those for the intersection of Myrtle Avenue and Freshwater-Kneeland Road. The two intersections are located near Humboldt Bay, approximately 5.1 miles apart.

The percentage of vehicles operating in cold-start mode is not expected to be substantially different for the proposed project than that for the intersection of Route 101 and Henderson Street. At maximum, each can expect 10-15 percent of vehicles operating in a cold-start mode according to the *Transportation Project-Level Carbon Monoxide Protocol*, prepared by the University of California, Davis, Institute of Transportation Studies.

It is assumed that there would be more heavy-duty gas trucks present at the intersection of Route 101 and Henderson Street than at the intersection of Myrtle Avenue and Freshwater-Kneeland Road. This is due to denser urban land uses surrounding the intersection of Route 101 and Henderson Street compared to the worst-case intersection on Route 101.

Background CO concentrations would be higher at the intersection of Route 101 and Henderson Street than at the intersection of Myrtle Avenue and Freshwater-Kneeland Road because the land uses surrounding the intersection of Route 101 and Henderson Street are denser than the predicted land uses surrounding the intersection of Myrtle Avenue and Freshwater-Kneeland Road.

The intersection of Freshwater-Kneeland Road and Myrtle Avenue, under Alternative 1, satisfies the conditions listed above and would not contribute to a localized exceedance of CO emission standards. Therefore, none of the intersections of the proposed project for any one of the Build Alternatives would lead to a violation of CO standards.

Carbon Monoxide Analysis Conclusion

As shown in the analyses of CO impacts, the mainline segments and intersections affected by the proposed project at year 2041 would have lower potential CO concentrations than the year 2005 worst case mainline segment and worst case intersection. Since the year 2041 project CO concentrations would be less than worst case scenarios, then the Build Alternatives would also be less than the worst case scenario for the current year since the current traffic volumes are less than the projected year 2041 traffic volumes. These worst-case roadways currently exist in regions that demonstrate attainment of CO air quality standard. As such, none of the Build Alternatives would result in a violation of the CO standard.

$PM_{2.5}$ and PM_{10} Hot Spot Analysis

Particulate matter is the term for solid or liquid particles found in the air. Some particles are large or dark enough to be seen, such as soot or smoke; others are so small they can be detected only with an electron microscope. Because particles originate from a variety of mobile and stationary sources (diesel trucks, woodstoves, power plants, etc.), their chemical and physical compositions vary widely. Sources of both $PM_{2.5}$ and PM_{10} are shown in Table 3-17. Particulate matter can be directly emitted or can be formed in the atmosphere when gaseous pollutants such as SO_2 and NOx react to form fine particles.

The proposed project is located within an area that is not in attainment for the PM_{10} State air quality standard. For this reason, the following qualitative particulate matter hot spot analysis for both $PM_{2.5}$ and PM_{10} was prepared.

A hot-spot analysis is defined in Section 93.101 of 40 the Code of Federal Regulations (CFR) as an estimation of likely future localized pollutant concentrations and a comparison of those concentrations to the relevant air quality standards. A hot-spot analysis assesses the air quality effects on a project-level—a scale smaller than an entire nonattainment area, such as for congested roadway intersections and highways. Such an analysis is a means of demonstrating that a transportation project meets the federal Clean Air Act conformity requirements to support state and local air quality goals with respect to achieving the attainment status in a timely manner.

Analysis Methodology and Types of Emissions Considered

The Environmental Protection Agency and FHWA established in the *Transportation Conformity Guidance for Qualitative Hot-Spot Analyses in $PM_{2.5}$ and PM_{10} Nonattainment and Maintenance Areas* the following two methods for completing a $PM_{2.5}$ and PM_{10} hot-spot analysis:

1. Comparison to another location with similar characteristics (pollutant trend within the air basin);
2. Air quality studies for the proposed project location (ambient PM trend analysis in the project area).

This analysis uses a combined approach to demonstrate that the proposed project would not result in a new or worsened $PM_{2.5}$ or PM_{10} violation, in combination with changes in background air quality concentrations. The project also must not increase the frequency or severity of any existing violation of any standard in any area; or delay timely attainment of any standard or any required interim emission reductions or other milestones in any area (Federal Clean Air Act section 176(c)(1)(B)). Method 1 was applied to the carbon monoxide analysis discussed previously in this air quality section.

Temporary construction emissions are discussed separately later in this air quality section. Project construction is anticipated to require 2 to 3 years. In addition, the project must comply with Caltrans Standard (contract) Specification for construction-related dust control measures, which ensure that dust from construction activities are minimized or avoided. Consequently, construction-related $PM_{2.5}$ and PM_{10} emissions were not included in the hot spot analysis pursuant to 40 CFR 93123(c)(5).

Air Quality Trend Analysis

Local air quality data was obtained from the Eureka I Street monitoring station to characterize existing air quality and predict future conditions in the project area. In addition to monitoring data, this analysis presents project-level traffic data for the existing and design years to help characterize $PM_{2.5}$ and PM_{10} emissions generated in the project area, impacts of the project, and the likelihood of these impacts interacting with the ambient $PM_{2.5}$ and PM_{10} levels to cause hot spots.

Data Considered

Hot-spot analyses under this guidance must be based only on directly emitted $PM_{2.5}$ or PM_{10} emissions. $PM_{2.5}$ and PM_{10} precursors are not considered.[22] The Eureka I Street air quality monitoring station at 529 I Street in downtown Eureka is about one mile southwest of the south end of the project. Although the I Street monitoring station is not within the actual project area, because of its close proximity and similar climate conditions, it is sufficient to represent the project area.

Project Description

There are five Build Alternatives described in Chapter 2. All five Build Alternatives include various improvements along the existing Route 101 alignment to enhance safety and intersection level of service, but would not add highway vehicle capacity.

Trends in PM2.5 and PM10 Concentrations

Table 3-18 presents monitored $PM_{2.5}$ and PM_{10} concentrations at the I Street monitoring station for the past 5 years. The data in Table 3-18 indicates that the national 24-hour average $PM_{2.5}$ standard was not exceeded in the past 5 years. The national annual average $PM_{2.5}$ standard was also not exceeded at the monitoring station in any of the past five years. Table 3-18 indicates both the $PM_{2.5}$ concentration annual and 24-hour average have remained constant over the past 5 years. Also, these values have remained below both the current national and state $PM_{2.5}$ standards.

[22] Secondary particles formed through $PM_{2.5}$ and PM_{10} precursor emissions from a transportation project take several hours to form in the atmosphere, giving emissions time to disperse beyond the immediate project area of concern for localized analyses.

For PM_{10}, Table 3-18 indicates exceedances and concentrations have remained relatively constant over the past five years. The estimated days the State 24-Hour PM_{10} Standard would have been exceeded (had sampling occurred every day of the year) was much lower in 2007-8, but remained constant from 2009 to 2011.

Climate and Meteorology

The climate and meteorological conditions for the project area are required for particulate matter analysis; refer to the beginning of the Air Quality section for a discussion of meteorology and climate.

Surrounding Land Uses

A sensitive air quality receptor is a facility or land use that houses or attracts members of the population (such as children, the elderly, and people with illnesses) who are particularly sensitive to the effects of air pollutants. There are no parks, medical facilities, or schools adjacent to Route 101 between Eureka and Arcata. Surrounding land uses adjacent to Route 101 between Eureka and Arcata include businesses, wildlife refuges, industry/manufacturing, and pasture (see Figure 3-1). There are residences adjacent and one public school along Old Arcata Road between Eureka and Arcata. There are numerous residences adjacent to State Route 255 (between Eureka and Arcata).

Future Trends

Emission trend data is available in the 2013 edition of *The California Almanac of Emissions and Air Quality* published by the California Air Resources Board (CARB). Although the project area is not within any of the regions in the almanac, the San Francisco Bay Area Air Basin is cited here to provide general air quality trends, since implementation of emission standards and control requirements that have an effect on regional pollutant concentrations are likely to result in similar trends at the local level. Both the San Francisco Bay Area and the Eureka–Arcata area are strongly influenced by ocean conditions; however, the Bay Area would represent a "worst-case" scenario because future population growth is expected to be much higher than the Eureka–Arcata area.

In the San Francisco Bay Area Air Basin, emissions associated with on-road emissions indicate that total on-road emissions are expected to remain constant through 2020, with increases in emissions from on-road gasoline vehicles offset by substantial decreases in emissions from on-road diesel vehicles. Because of the adoption of more stringent emission standards, $PM_{2.5}$ emissions from diesel motor vehicles decreased from 2000 to 2010, even though population and vehicles miles traveled (VMT) increased. Emissions from diesel mobile sources are projected to continue to decrease through 2035.

According to the CARB Almanac, total emissions are projected to increase slightly (from approximately 81 tons/day to 85 tons/day) from 2010 through 2020 even though regional population is anticipated to increase from 6,783,762 in 2000 to 8,018,000 in 2020 and jobs are anticipated to increase from 3,753,460 in 2000 to 4,040,690 in 2020. In contrast, population growth in Humboldt County is much less. According to the 2010 U.S. Census, total population of the county is 134,623, which is an increase from 126,518 in 2000. The county's population is projected to grow to approximately 141,100 by 2020. *(Source: U.S. Department of Commerce, Bureau of the Census, 2010; Dyett & Bhatia, 2002)* Since the population growth is less than the San Francisco Bay Area, the increase in emissions in Humboldt County is expected to be very slight or negligible.

Transportation and Traffic

With population and employment growth expected to occur regionally, it is anticipated that the growth would result in increased traffic on Route 101. On Route 101 between Eureka and Arcata, the average annual daily traffic is expected to increase from 39,000 vehicles per day in 2013 to approximately 50,000 by 2041 on Route 101 (see Chapter 1 for more information). Route 101 currently has four-lanes (two-lanes in each direction) between Eureka Slough bridge (in Eureka) and Gannon Slough bridge (in Arcata) with a posted 50 mph speed limit. Vehicle headlights are currently required to be on 24 hours a day in this segment of the corridor. North of the Gannon Slough bridges in Arcata, the expressway changes to a four-lane freeway with a posted 65 mph speed limit. The proposed project would not add highway carrying capacity and the posted speed limit would remain unchanged after construction.

For the year 2010, a level of service (LOS) of "D" for Route 101 northbound mainline (through traffic or non-intersection travel) and a LOS of "C" for Route 101 southbound mainline were calculated between Eureka and Arcata. By year 2041, Route 101 northbound 101 LOS is expected to remain LOS "D" and Route 101 southbound would remain at LOS "C" for any one of the Alternatives including the No-Build. (See Appendix B for an explanation of LOS.)

As stated previously, the proposed project would not add traffic carrying capacity; however, all Build Alternatives would, to varying degrees, increase vehicle miles traveled (VMT) because the median access restrictions would result in out-of-direction travel. The increase in VMT would result in a net increase of particulate matter. Other variables, such as the posted speed limit and through traffic, would remain essentially unchanged from the existing condition for each alternative.

Alternative 1 would have the highest VMT of the alternatives since the out-of-direction travel could be as high as 10 miles for round trips originating at Airport Road and traveling to the Eureka urban area. In addition, round trips from the heaviest traveled local road, Indianola Cutoff, to Eureka or Arcata would require 4.9 or 6.3 miles of out-of-direction travel. Alternatives 1A, 2, 3, and Modified Alternative 3A would have substantially less collective out-of-direction travel (and VMT) because these alternatives have either grade separations, signals, or turnarounds that would minimize out-of-direction travel at the most heavily traveled intersections. (Refer to Chapter 3, Section 3.1.6 Traffic and Transportation for more information.)

The Route 101 mainline (consisting of through traffic lanes) would not be realigned closer to residences and businesses. All project alternatives, however, include some combination of extending acceleration and deceleration lanes, constructing interchange ramps, modifying the Route 101/Airport intersection, or constructing turnarounds (Alternative 1A only). These improvements would result in aligning traffic slightly closer (approximately 1 to 2 feet) to the residences near Airport Road. The closest individual dwellings within the mobile home park on Jacobs Avenue are approximately 90 feet from the existing Route 101 traveled way.

Local Roads

In addition to Route 101, State Route 255 and Old Arcata Road provide alternate routes between Eureka and Arcata. None of the Build Alternatives would adversely affect or benefit intersections on Old Arcata Road or State Route 255 except Alternative 1, which would close all at-grade intersection median crossings without constructing a grade separation or signalization. Alternative 1 would result in out-of-direction travel diversion to Old Arcata Road; traffic volume is expected to increase by approximately 60 percent on Old Arcata Road between Eureka and Indianola Cutoff for both year 2013 and year 2041 compared to the No-Build condition. (For more information, see Chapter 3, Section 3.1.6 Traffic and Transportation.)

Furthermore, as stated previously in the Greenhouse Gases and Climate Change subsection, vehicular emission rates are anticipated to lessen in future years due to continuing improvements in engine technology and the retirement of older, higher-emitting vehicles.

Route 101 Truck Volumes

The proposed project would enhance safety and improve intersection LOS without adding through traffic lanes. For these reasons, the proposed project would not change the proportion of diesel engine trucks or buses. Since 2000, commercial trucks comprised approximately 4.2 percent to 8 percent of the total traffic on Route 101 between Eureka and Arcata. In 2010, commercial trucks comprised approximately 4.6 percent to 6.7 percent of the total traffic at the same location. *(Source: Caltrans 2000 and 2010 Annual Average Daily Truck Traffic on the California State Highway System Compiled by Caltrans Traffic and Vehicle Data Systems, no date)* Alternative 1 is expected to increase out-of-direction travel on Old Arcata Road; however, Old Arcata Road is a county road not designed for large commercial trucks. Instead of using Old Arcata Road, large trucks have the opportunity to turn around at the 101/255 interchange in Arcata.

The proposed project is not expected to change the proportion (i.e., vehicle fleet mix) of diesel trucks traveling on Route 101 for the following reasons:

- The percentage of diesel trucks has remained relatively constant for the past 10 years;
- The proposed project is not a highway vehicle capacity increasing project;

- The project does not include constructing a new connection to a major highway;
- The posted speed limit on Route 101 is not planned to be changed after project construction;
- There is no planned construction of bus facilities or other facilities within the Eureka-Arcata Route 101 corridor that would generate additional diesel vehicle trips.

Particulate Matter - Regional Cumulative Impacts

Operation of the proposed project would result in regional emissions of ozone precursors (nitrogen oxides and reactive organic gases that react to form ozone), carbon monoxide, and inhalable particulate matter (PM_{10} and $PM_{2.5}$) that could have a cumulative effect with other pollutant sources in the area. These emissions are addressed and accounted for in the regional analysis performed for the proposed project's inclusion in the RTP for Humboldt County. This RTP was found to conform to the SIP. (See Chapter 3, Section 3.6 Cumulative Impacts for more discussion of cumulative impacts.)

Particulate Matter - Construction Effects

Construction is a source of dust and equipment emissions that can have temporary impacts on local air quality (i.e., exceed state or national air quality standards for PM_{10}). Construction emissions would result from earthmoving (fugitive dust) and heavy equipment use (vehicle exhaust). These emissions would be generated from land clearing, ground excavation, cut and fill operations, delivery of excavated material, and the construction of the project facilities. Dust emissions would vary from day to day depending on the level of activity, the specific operations, and the prevailing weather.

In addition to particulate emissions from earth moving, combustion emissions from fuel-powered construction equipment may create a temporary impact on local air quality. NCUAQMD CEQA Guidelines do not provide a numerical threshold of significance for these emissions. Instead, the emphasis is on minimization of this type of temporary effect. NCUAQMD Regulation 1 Rule 430 specifies measures to minimize harm for controlling fugitive dust emissions. If the project follows the practices described in Regulation 1 Rule 430, the impact is not considered adverse. Measures to minimize fugitive dust are described later in this section.

Construction activities for large development projects are estimated by the EPA to add 1.2 tons of fugitive dust per acre of soil disturbed per month of activity. In addition to dust-related PM_{10} emissions, heavy trucks and construction equipment powered by gasoline and diesel engines would generate CO, SO_2, NO_x, VOCs and some soot particulate (PM_{10} and $PM_{2.5}$) in exhaust emissions. Table 3-18 shows an estimate of construction emissions for the proposed project. These emissions would be temporary and limited to the immediate area surrounding the construction site.

Table 3-18 Emissions from Road Construction*

Road Construction Emissions Model, Version 7.1.5.1 With Water Truck

Emission Estimates for -> Eureka-Arcata Corridor										
Project Phases (English Units)	**ROG (lbs/day)**	**CO (lbs/day)**	**NOx (lbs/day)**	**Total PM_{10} (lbs/day)**	**Exhaust PM_{10} (lbs/day)**	**Fugitive Dust PM_{10} (lbs/day)**	**Total $PM_{2.5}$ (lbs/day)**	**Exhaust $PM_{2.5}$ (lbs/day)**	**Fugitive Dust $PM_{2.5}$ (lbs/day)**	**CO_2 (lbs/day)**
Grubbing/Land Clearing	5.3	35.3	40.5	101.9	1.9	100.0	22.5	1.7	20.8	6,654.7
Grading/Excavation	19.5	126.5	199.7	108.9	8.9	100.0	28.7	7.9	20.8	29,117.8
Drainage/Utilities/Sub-Grade	14.3	93.4	126.5	106.3	6.3	100.0	26.5	5.7	20.8	18,291.4
Paving	5.0	36.7	34.1	1.9	1.9	-	1.7	1.7	-	6,301.8
Maximum (pounds/day)	19.5	126.5	199.7	108.9	8.9	100.0	28.7	7.9	20.8	29,117.8
Total (tons/construction project)	2.8	18.3	26.4	18.1	1.2	16.8	4.6	1.1	3.5	3,892.6
Notes: Project Start Year ->	2019									
Project Length (months) ->	18									
Total Project Area (acres) ->	15									
Maximum Area Disturbed/Day (acres) ->	10									
Total Soil Imported/Exported (yd^3/day)->	625									

(Source: Sacramento Metropolitan Air Quality Management District, 2014)

*NOTE: This table summarizes approximate construction emission modeling results based on a hybrid of the Build Alternatives: three years of construction, a project area of 15 acres, 625 cubic yards of material imported per day, 10 acres of disturbance.

PM_{10} and $PM_{2.5}$ estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM_{10} emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns H and I. Total $PM_{2.5}$ emissions shown in Column J are the sum of exhaust and fugitive dust emissions shown in columns K and L.

AVOIDANCE, MINIMIZATION, AND/OR MITIGATION MEASURES

As discussed in the Environmental consequences section, post-construction project air quality impacts are not anticipated; therefore, avoidance, minimization, or mitigation measures are not proposed.

Measures to minimize particulate emissions

Although the proposed project is not expected to create or worsen particulate matter air quality violations both for the existing year and the future design year, Caltrans has adopted policies to help reduce air emissions statewide. Caltrans promotes measures, practices, and business operations to minimize GHG emissions. These can include, but are not limited to the following: advocating for efficient land use and transportation planning; Transportation Demand Management strategies; implementing operational improvements to increase the efficiency of the transportation system; incorporating climate change mitigation, adaptation, and energy efficient strategies into the design and maintenance of Caltrans facilities; and seeking new opportunities to implement clean energy alternatives when possible. *(Source: Caltrans Director's Climate Change Policy DP-30, June 22, 2012)*

The proposed project for the existing year and the future design year would not result in new or worsened $PM_{2.5}$ or PM_{10} violations for the reasons summarized in Table 3-19.

Table 3-19 $PM_{2.5}$ or PM_{10} Conclusion Summary		
Particulate Matter Analysis Criteria	**Analysis Summary**	**Analysis Result/Finding**
EPA 2006 final rule of an example of a project that would ***likely*** be covered by 40 CFR 93.123(b)(1) (i.e., considered a project of air quality concern)	A project on a new highway or expressway that serves a significant volume of diesel truck traffic, such as facilities with greater than 125,000 Annual Average Daily Traffic (AADT) and 8% or more of such AADT is diesel truck traffic. Year 2011 AADT on Route 101 is 36,000* and it is not expected to exceed the EPA's Project of Air Quality Control threshold of 125,000 AADT within the 20-year planning horizon. Also, the proposed project is not a new highway.	The proposed project is clearly not an example of a project that the EPA would consider to be a project of air quality concern.
FHWA and EPA's Project of Air Quality Concern diesel truck percentage threshold is 8% of overall vehicle fleet composition.	The current diesel truck percentage of overall traffic is approximately 4% to 7% on Route 101 between Eureka and Arcata. Also the proposed project would not substantially affect diesel truck volumes and percentages between Build and No-Build Alternatives since the project does not include a new connection to a major highway and the project would not increase the carrying capacity of Route 101.	In terms of diesel truck percentage, the proposed project is below the FHWA and EPA threshold of air quality concern.
Project related $PM_{2.5}$ and PM_{10} emission	$PM_{2.5}$ and PM_{10} emissions are expected to slightly increase from this project because of minor increases in vehicle miles traveled (VMT) compared to the No-Build Alternative. The access restrictions would increase out-of-direction travel, but the proposed interchange and half or full signalization would minimize the out-of-direction travel for Alternatives 3 and Modified 3A. Alternatives 1, 1A, and 2 would have more $PM_{2.5}$ and PM_{10} emissions resulting from higher out-of-direction travel.	The additional VMT varies by alternative; however any additional VMT would be offset by improved intersection level of service (i.e., reduced delay at intersections) and other factors such as continuing improvements in engine technology and retirement of older, higher-emitting vehicles.
Local $PM_{2.5}$ and PM_{10} emission trends	Based on representative monitoring data, ambient $PM_{2.5}$ concentrations are remaining relatively constant (24-hour $PM_{2.5}$ standard) or declining (annual $PM_{2.5}$ standard). Based on representative monitoring data, monitored annual average $PM_{2.5}$ concentrations have not exceeded both the state and national standards in the past five years (see Table 3-13).	The project would not worsen local $PM_{2.5}$ and PM_{10} emission trends.

*AADT source: Caltrans Traffic Volumes Annual Average Daily Traffic (AADT) for all vehicles on California State Highways

For these reasons, for both the existing and future design year, the proposed project is not expected to worsen $PM_{2.5}$ or PM_{10} violations of standards. Therefore, the proposed project meets the conformity hot spot requirements in 40 CFR 93.116 and 93.126 for $PM_{2.5}$ and PM_{10}.

Construction

As discussed previously, impacts from dust generation by excavation and construction activities would be localized and of a temporary nature. Dust control practices, as described in NCUAQMD Rule 1-4-430 and below, would be employed to minimize or avoid potential exceedances (violations) of the PM_{10} air quality standard during construction.

(a) The handling, transporting, or open storage of materials in such a manner which allows or may allow unnecessary amounts of particulate matter to become airborne shall not be permitted.

(b) Reasonable precautions shall be taken to prevent particulate matter from becoming airborne, including, but not limited to, the following provisions:

(1) Covering open bodied trucks when used for transporting materials likely to give rise to airborne dust.

(2) Installation and use of hoods, fans, and fabric filters to enclose and vent the handling of dusty materials. Containment methods can be employed during sandblasting and other similar operations.

(3) Conduct agricultural practices in such a manner as to minimize the creation of airborne dust.

(4) The use of water or chemicals for control of dust in the demolition of existing buildings or structures, construction operations, the grading of roads, or the clearing of land.

(5) The application of asphalt, oil, water or suitable chemicals on dirt roads, materials stockpiles, and other surfaces which can give rise to airborne dusts.

(6) The paving of roadways and their maintenance in a clean condition.

(7) The prompt removal of earth or other material from paved streets onto which earth or other material has been transported by trucking or earth moving equipment, erosion by water, or other means.

In addition, employing the following measures to minimize pollutant emissions from construction equipment exhaust would be employed as appropriate and reasonable:

- Keeping engines properly tuned;
- Limiting idling;
- Avoiding unnecessary concurrent use of equipment.

If emission levels are exceeded during construction, consider using Enhanced Fugitive PM Dust Control Practices as an option to reduce pollutant emissions.

After construction, none of the Build Alternatives would have an adverse impact on air quality; consequently, no project-specific air quality-related mitigation measures are required.

Climate Change

The Council on Environmental Quality (CEQ) released Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Reviews (August 1, 2016). This final guidance provides a framework for federal agencies to consider both the effects of a proposed action on climate change, as indicated by its estimated greenhouse gas emissions, and the effects of climate change on a proposed action. Climate change is discussed in Chapter 4 of this document. As the CEQ guidance aligns with the analysis required by the state of California under CEQA, the analysis in Chapter 4 will be used to inform the NEPA decision for the project. However, the CEQ guidance does not apply to this project, as this project was initiated prior to the guidance being adopted.

3.2.7 Noise

This section includes several technical terms and concepts to describe traffic noise. For an explanation to gain a better understanding of this section, please refer to Appendix F - Traffic Noise Fundamentals. This section is based on the Noise Impact Study (URS 2007) and Addendum memo (Caltrans 2016).

REGULATORY SETTING

The National Environmental Policy Act (NEPA) of 1969 and the California Environmental Quality Act (CEQA) provide the broad basis for analyzing and abating highway traffic noise effects. The intent of these laws is to promote the general welfare and to foster a healthy environment. The requirements for noise analysis and consideration of noise abatement and/or mitigation, however, differ between NEPA and CEQA.

California Environmental Quality Act (CEQA)

CEQA requires a strictly baseline versus build analysis to assess whether a proposed project will have a noise impact. If a proposed project is determined to have a significant noise impact under CEQA, then CEQA dictates that mitigation measures must be incorporated into the project, unless such measures are not feasible. The rest of this section will focus on the NEPA-23 CFR 772 noise analysis. See Chapter 4 of this document for further information on noise analysis under CEQA.

National Environmental Policy Act (NEPA) and 23 CFR

For highway transportation projects with FHWA (and Caltrans, as assigned) involvement, the Federal-Aid Highway Act of 1970 and the associated implementing regulations (23 Code of Federal Regulations 772) govern the analysis and abatement of traffic noise impacts. The regulations require that potential noise impacts in areas of frequent human use be identified during the planning and design of a highway project. The regulations contain noise abatement criteria (NAC) that are used to determine when a noise impact would occur. NAC differs depending on the type of land use under analysis. For example, NAC for residences (67 dBA) is lower than NAC for commercial areas (72 dBA). Table 3-20 lists the noise abatement criteria for use in the NEPA-23 CFR 772 analysis.

Table 3-20: Noise Abatement Criteria		
Activity Category	**NAC, Hourly A-Weighted Noise Level, Leq(h)**	**Description of activity category**
A	57 (Exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B[1]	67 (Exterior)	Residential.
C[1]	67 (Exterior)	Active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings.
D	52 (Interior)	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios.
E	72 (Exterior)	Hotels, motels, offices, restaurants/bars, and other developed lands, properties, or activities not included in A–D or F.
F	No NAC—reporting only	Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical, etc.), and warehousing.
G	No NAC—reporting only	Undeveloped lands that are not permitted.

[1] Includes undeveloped lands permitted for this activity category.

Table 3-21 lists the noise levels of common activities to enable readers to compare the actual and predicted highway noise-levels discussed in this section with common activities.

Table 3-21 Noise Activity Comparisons

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
Jet Fly-over at 300m (1000 ft)	110	Rock Band
Gas Lawn Mower at 1 m (3 ft)	100	
Diesel Truck at 15 m (50 ft), at 80 km (50 mph)	90	Food Blender at 1 m (3 ft)
Noisy Urban Area, Daytime	80	Garbage Disposal at 1 m (3 ft)
Gas Lawn Mower, 30 m (100 ft); Commercial Area	70	Vacuum Cleaner at 3 m (10 ft); Normal Speech at 1 m (3 ft)
Heavy Traffic at 90 m (300 ft)	60	Large Business Office
Quiet Urban Daytime	50	Dishwasher Next Room
Quiet Urban Nighttime; Quiet Suburban Nighttime	40	Theater, Large Conference Room (Background)
Quiet Rural Nighttime	30	Library; Bedroom at Night, Concert Hall (Background)
	20	Broadcast/Recording Studio
	10	
Lowest Threshold of Human Hearing	0	Lowest Threshold of Human Hearing

In accordance with the Caltrans *Traffic Noise Analysis Protocol for New Highway Construction and Reconstruction Projects, May 2011*, a noise impact occurs when the future noise level of the project results in a substantial increase in noise level (defined as a 12 dBA or more increase) or when the future noise level of the project approaches or exceeds the NAC. Approaching the NAC is defined as coming within 1 dBA of the NAC.

If it is determined that the project will have noise impacts, then potential abatement measures must be considered. Noise abatement measures that are determined to be reasonable and feasible at the time of final design are incorporated into the project plans and specifications. This document discusses noise abatement measures that would likely be incorporated in the project.

The Caltrans *Traffic Noise Analysis Protocol* sets forth the criteria for determining when an abatement measure is reasonable and feasible. Feasibility of noise abatement is basically an engineering concern. A minimum 7 dBA reduction in the future noise level must be achieved for an abatement measure to be considered feasible. Other considerations include topography, access requirements, other noise sources, and safety considerations. The reasonableness determination is basically a cost-benefit analysis. Factors used in determining whether a proposed noise abatement measure is reasonable include residents acceptance and the cost per benefited residence.

AFFECTED ENVIRONMENT

Study Methods and Procedures

Identification of Noise Sensitive Receiver Locations

Noise sensitive receiver locations (Category B and C land uses) in the vicinity of the project area, including the Lazy J Trailer Ranch (a mobile home park) and Redwood Coast Cabins and RV Resort, were identified through a review of aerial photos of the project area and a subsequent visit to the study area. Noise readings were recorded at the Lazy J residences, since they would potentially be exposed to traffic noise impacts from the project. Individual noise reading locations are shown as black dots in Figure 3-25 and each black dot has a location designation to correspond with the designations in Tables 3-22 and 3-23.

There are two other Category C land uses consisting of public ball fields. These ball fields are located near the Route 101/255 interchange. At this location there would be a negligible or no change in traffic speed or volumes from the project. There were no other noise-sensitive receiver locations identified. Noise measurements were only made at residential areas within the project limits. The posted speed limit on Route 101 at the locations where the residences were studied is 50 mph.

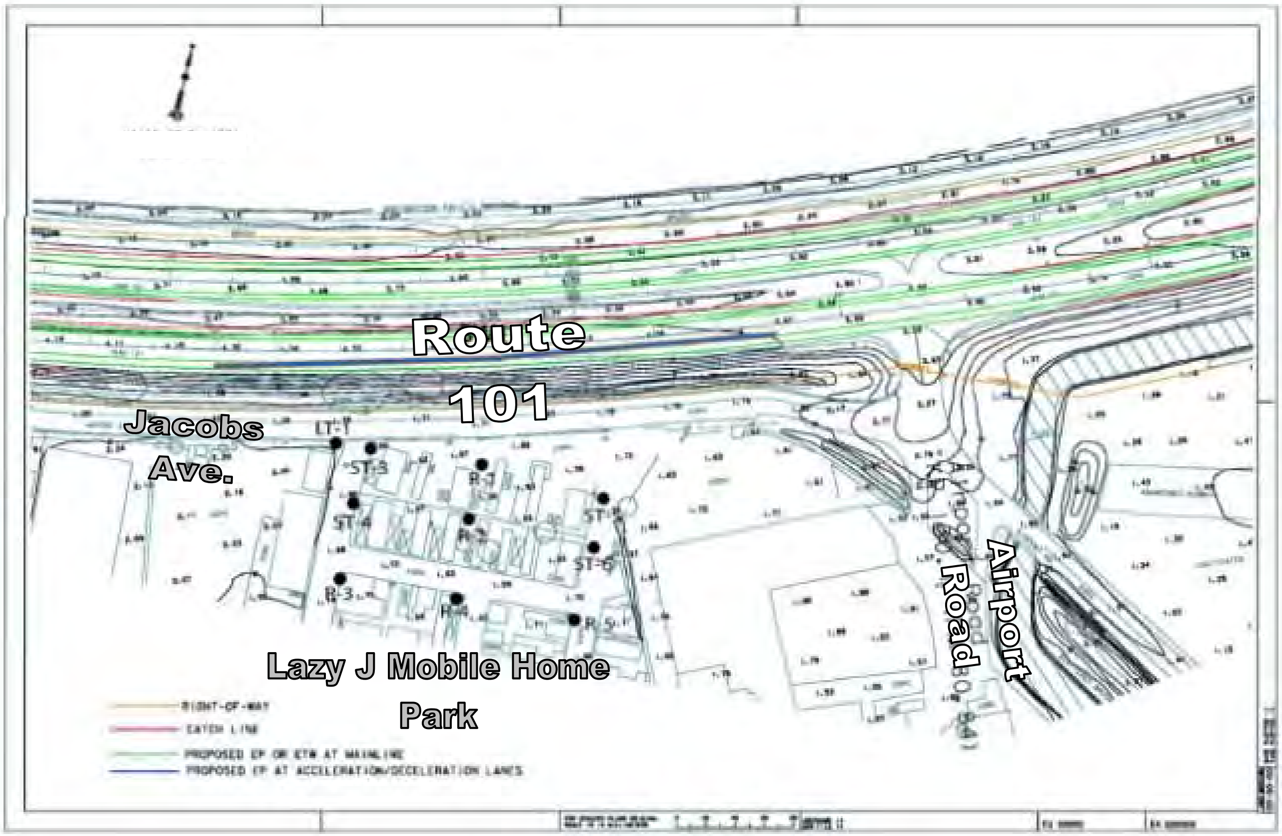

Figure 3-25 Noise Receiver Map

Measurement of Existing Sound Levels. A summary of measured traffic noise levels and corresponding noisiest hour noise levels are shown in Table 3-22. Because traffic noise can vary substantially over time, noise measurements are conducted over varying time periods. Noise measurements were conducted at a mobile home park (Lazy J Trailer Ranch) and Redwood Coast Cabins and RV Resort on June 10 and 11, 2003[23]. The noise measurement program consisted of a combination of long-term measurements (24-hours in duration) and short-term measurements (ten-minutes in duration). Two long-term noise measurement locations and five short-term noise measurement locations were selected to represent the varying noise exposures of the identified Category B and C receivers.

[23] The Safety Corridor was in operation at this location at the time of the noise measurement in 2003. Since 2003, the roadway conditions/configuration have not changed except for the closure of the Route 101 median at Cole Avenue and the acceleration and deceleration lanes improvements at Airport Road.

Table 3-22 Existing Noise Levels*

Site	Location	Type of Development	Noise Abatement Category and Criterion (dBA)	Date	Time	Leq (dBA)	L(1) (dBA)	L(10) (dBA)	L(50) (dBA)	L(90) (dBA)	Existing Worst Hour Noise Level, Leq(hr) (dBA)
ST-1	South End of the Lazy J Trailer Ranch ~ 34 meters from the Center of the Near Northbound Travel Lane of Highway 101 (1st Row Receiver)	Residential	B(67)	6/10/2003	16:40	66.3	78.4	66.9	62.8	57.9	**65**
					16:50	64.7	75.4	67.2	62.2	56.1	
					17:00	66.7	75.7	69.7	64.3	60.3	
ST-2	South End of the Lazy J Trailer Ranch ~ 48 meters from the Center of the Near Northbound Travel Lane of Highway 101 (2nd Row Receiver)	Residential	B(67)	6/10/2003	17:16	60.5	67.6	62.8	59.8	56.7	**62**
					17:20	58.3	64.8	61	57.5	51.1	
					17:30	58.8	66.7	61.6	57.6	52.2	
ST-3	North End of the Lazy J Trailer Ranch ~ 46 meters from the Center of the Near Northbound Travel Lane of Highway 101	Residential	B(67)	6/10/2003	17:45	61.6	67.2	64.4	61.1	53.8	**65**
					17:50	61.5	67.2	64.4	61	54.3	
					18:00	60.7	68	63.7	59.3	54.1	
ST-4	North End of the Lazy J Trailer Ranch ~ 67 meters from the Center of the Near Northbound Travel Lane of Highway 101	Residential	B(67)	6/10/2003	18:10	56.8	62.9	59.6	55.9	50.9	**62**
ST-5	Eureka KOA Hike/Bike Camps ~ 162 meters from the Center of the Near Northbound Travel Lane of Highway 101	Residential	C(67)	6/11/2003	11:50	53	58	55.2	52.7	49	**53**
					12:00	52.4	57	54.6	51.9	49.2	
					12:10	53.4	59.5	55.7	52.5	49.8	

***** Traffic noise levels are listed in six table headings as follows:

L(eq) = Average noise level during the time measurement period

L(1) = Highest noise levels exceeding the level shown 1 percent of the time. For example, at Site ST-1 at 16:40, the L(1) = 78.4 dBA, which indicates noise levels exceeded 78.4 dBA 1 percent of the time

L(10) = Highest noise level exceeding the level shown 10 percent of the time

L(50) = Highest noise level exceeding the level shown 50 percent of the time

L(90) = Highest noise level exceeding the level shown 90 percent of time

Leq(hr) = Average noise level during the worst hour (i.e., the highest average noise level occurs during the period of highest traffic volumes)

Long-term noise measurements were conducted to show the trend in both 10 minute and hourly traffic noise levels throughout a 24–hour period. Care was taken to select sites that were primarily affected by noise from Route 101 and to avoid sites in which noise contamination from sources other than the roadway may occur. During the noise monitoring survey, construction was occurring in close proximity to the long-term noise measurement chosen to represent the noise environment of the Lazy J Trailer Ranch.

Additionally, Redwood Coast Cabins and RV Resort (Bracut area) is located adjacent to a small lumber business (Resale Lumber Products), and noise generated by these sources contributed substantially at times to the measured noise levels. The noise data collected at both long-term noise measurement sites was reviewed carefully to exclude these noise sources.

Short-term noise measurements were conducted simultaneously with traffic counts at five locations throughout the study area in ten-minute intervals. Measurements were repeated several times at some locations to confirm traffic noise levels or assess variability due to noise sources other than adjacent highways. Short-term noise measurements were conducted outdoors at areas of frequent human activity or at acoustically equivalent locations. The microphones were located approximately five feet above the surrounding ground and at least 9.8 feet from structures. Peak hour noise levels at each receiver were calculated by adjusting for differences in traffic conditions during measurements and the loudest existing hourly traffic conditions. The adjusted peak-hour noise levels were compared to trends measured at nearby long-term noise measurement locations.

Noise measurement locations are used as noise modeling receivers for prediction of future noise levels.

ENVIRONMENTAL CONSEQUENCES

Traffic Noise Level Prediction

The traffic model predicted the highest traffic noise levels based on existing, future no-project, and future with project alternatives. Traffic volume inputs into the traffic noise model were taken from the project traffic projections. Traffic noise levels were calculated for existing peak traffic hour conditions and future build conditions.

The noisiest hour is not necessarily the hour with peak traffic volumes. Congestion results in slower speeds, which substantially reduces noise levels. The loudest hour is typically an hour where traffic flows freely at or near capacity conditions.

Traffic mix was based on the average of traffic counts reported in the *2001 Annual Average Daily Truck Traffic on the California State Highway System* [24] report (Compiled by the Caltrans Traffic Data Branch). The existing and future traffic mix was applied to the counted and projected volumes and was modeled as follows:

96 percent	Light-Duty Autos
2 percent	Medium-Duty Trucks
3 percent	Heavy-Duty Trucks

[24] The original noise study included the year 2001 reference. The *2012 Annual Average Daily Truck Traffic on the California State Highway System* was consulted and the traffic mix was nearly identical. Thus, the year 2001 reference remains valid.

Free-flow traffic speeds observed in the field during the noise monitoring survey were approximately 50 mph for light-duty vehicles and medium-duty and heavy-duty trucks. In the project vicinity, a safety corridor has been established, the posted 50 mph speed limit is clearly posted, and radar is used to display vehicle speeds to drivers. Based on observations and pacing of vehicles in the project vicinity, the posted speed limit is generally adhered to.

After project construction, the current posted speed limit of 50 mph between the Eureka Slough bridges and Gannon Slough bridges would remain at the existing 50 mph. However, 45 days after project construction, Caltrans would conduct an Engineering and Traffic Survey to comply with the California Vehicle Code. The California Vehicle Code requires a renewed engineering and traffic survey whenever substantial changes in roadway or traffic conditions have occurred. If the prevailing 85th percentile of traffic eventually rises above 55 mph after project construction, Caltrans would be required to address the condition: raising the posted speed limit would be considered and possibly implemented. NOTE: North of the Gannon Slough bridges, Route 101 is a freeway with a current posted speed limit of 65 mph. The freeway posted speed limit would remain the same after construction.

For the purposes of traffic noise modeling for future year conditions, light-duty vehicles and trucks were modeled at a speed of 50 mph. Peak-hour traffic volumes by direction were not available, so an equal northbound and southbound split of traffic volumes was assumed.

This section discusses the results of noise modeling for future build conditions. As previously mentioned, Alternative 7, the No-Build Alternative would not result in noise impacts.

Future Noise Level Increases

Noise prediction modeling of future year 2041 traffic conditions predicts noise levels with the project would increase by up to 5 dBA at Category B receivers in the study area. (See Table 3-23.) Note that traffic is projected to increase in year 2041 (compared to the existing conditions) whether a project is constructed or not because traffic is expected to gradually increase over the next 20 years. Residence locations at the first- and second-row (in relation to Route 101) of the Lazy J Trailer Ranch would approach or exceed the FHWA Noise Abatement Criteria (66 dBA for residential or Category B areas). Receivers at the Redwood Coast Cabins and RV Resort would not approach or exceed the NAC. The project would not result in a substantial noise increase (12 dBA or more) at identified Category B or C uses in the study area.

The residents at the Lazy J Trailer Ranch on Jacobs Avenue are on the northbound side of Route 101 west of Airport Road. First row residences are primarily affected by noise generated by Route 101, but traffic noise generated by Jacobs Avenue and aircraft associated with Murray Field Airport also contribute to the noise environment at these receivers. Receivers are at elevations approximately 8 feet below Route 101.

Alternative 1. Alternative 1 would close all median crossings. Future noise level increases under Alternative 1 are predicted to be up to 4 dBA above existing levels as a result of the anticipated increase in traffic and increased travel speeds. First row receivers would have future noise levels from Route 101 traffic ranging from 68 to 69 dBA $L_{eq[h]}$. Future project noise levels are predicted to be about 66 to 68 dBA $L_{eq[h]}$ at second-tier receivers at the mobile home park, and approximately 61 to 62 dBA $L_{eq[h]}$ at third-tier receivers. Only first- and second-tier receivers would be considered noise impacted as future noise levels would approach or exceed the NAC.

Alternative 1A. Alternative 1A is similar to Alternative 1 except that it includes three median turnarounds and a Route 101 southbound left turn movements only signal at Airport Road. Future noise level increases would be similar to Alternative 3.

Alternative 2. Alternative 2 would close all median crossings. Future noise level increases under Alternative 2 are predicted to be up to 5 dBA above existing levels because of the anticipated increase in traffic and increased travel speeds. First row receivers would have future noise levels from Route 101 traffic ranging from 69 to 71 dBA $L_{eq[h]}$. Future project noise levels are predicted to be about 67 to 69 dBA $L_{eq[h]}$ at second-tier receivers at the mobile home park, and approximately 62 to 63 dBA $L_{eq[h]}$ at third-tier receivers. Only first- and second-tier receivers would be considered noise impacted as future noise levels would approach or exceed the NAC.

Alternative 3. Alternative 3 would close all median crossings and construct a third northbound lane between Cole Avenue and Mid-City Motor World. A fully signalized intersection would also be constructed at Airport Road. Travel speeds in the vicinity of Airport Road would be 50 mph. Future noise levels would increase by up to 2 dBA above existing levels under Alternative 3 because of the anticipated increase in traffic, changes in roadway geometry, and the signalized intersection. Because of Route 101 traffic, first-tier receivers would have future noise levels ranging from 66 to 68 dBA $L_{eq[h]}$. Future project noise levels are predicted to be 64 dBA $L_{eq[h]}$ at second-tier receivers at the mobile home park, and approximately 59 to 60 dBA $L_{eq[h]}$ at third-tier receivers. Only first tier receivers would be considered noise impacted as future noise levels would approach or exceed the NAC.

Modified Alternative 3A. This Alternative is similar to Alternative 3 except that the proposed grade separation at Indianola Cutoff was redesigned to reduce the wetland impact. This alternative also includes a half signal at Airport Road, which allows left turn movements to and from Route 101 at Airport Road. Future noise level increases would be similar to Alternative 3.

Alternative 7. Alternative 7 would not change the alignment of the Highway or increase travel speeds in the vicinity of Airport Road. Traffic noise modeling was not performed and noise abatement was not considered.

Eureka Redwood Coast Cabins and RV Resort

Receivers at the Redwood Coast Cabins and RV Resort (formerly KOA Campground) campground are located approximately 500 feet from the northbound Route 101 travel lane. Receivers within the campground are at elevations up to 16-feet above the roadway. Future noise level increases with the project for any one of the Build Alternatives are predicted to be up to 4 dBA above existing levels. Receivers at the resort would have future noise levels ranging from 57 to 64 dBA $L_{eq[h]}$. Receivers would not be considered noise impacted as future noise -levels would not approach or exceed the NAC under any of the project alternatives and future noise levels increases would not be substantial.

Table 3-23 Noise Modeling Results

Location	Description	Development Predates 1978? (Yes or No)	Existing PM Peak Leq(hr)	Alternative 1 2031 PM Peak Leq(hr)	Alternative 2 2031 PM Peak Leq(hr)	Alternative 3/6 2031 PM Peak Leq(hr)	2031 Project Noise Increase (+) or Decrease (-)	Impact Type (S, A/E, or NONE)
ST-3	South End of the Lazy J Trailer Ranch ~ 34 meters from the Center of the Near Northbound Travel Lane of Highway 101. (1st Row Receiver)	Yes	**67**	**68**	**69**	**66**	(-1) to 2	**A/E**
ST-4	South End of the Lazy J Trailer Ranch ~ 48 meters from the Center of the Near Northbound Travel Lane of Highway 101.	Yes	63	**68**	**69**	**64**	1 to 4	**A/E**
ST-5	North End of the Lazy J Trailer Ranch ~ 46 meters from the Center of the Near Northbound Travel Lane of Highway 101.	Yes	66	**69**	**70**	**67**	1 to 4	**A/E**
ST-6	North End of the Lazy J Trailer Ranch ~ 67 meters from the Center of the Near Northbound Travel Lane of Highway 101.	Yes	62	**66**	**67**	64	2 to 5	**A/E**
R-1	Lazy J Trailer Ranch - 1st Row Center	Yes	**67**	**69**	**71**	**68**	1 to 4	**A/E**
R-2	Lazy J Trailer Ranch - 2nd Row Center	Yes	64	**66**	**68**	64	0 to 4	**A/E**
R-3	Lazy J Trailer Ranch - 3rd Row South	Yes	61	62	63	60	(-1) to 2	NONE
R-4	Lazy J Trailer Ranch - 3rd Row Center	Yes	62	62	63	60	(-2) to 1	NONE
R-5	Lazy J Trailer Ranch - 3rd Row North	Yes	61	61	62	59	(-2) to 1	NONE
ST-8	Eureka KOA Hike/Bike Camps ~ 162 meters from the Center of the Near Northbound Travel Lane of Highway 101.	Yes	53	57	57	55	4	NONE
Impact Type	S = Substantial Increase (12 dBA or more)							
	A/E = Approach or Exceed NAC							
BOLD font indicates noise impact per FHWA/Caltrans Noise Policy under identified scenario.								

Construction Noise

Construction activities associated with the Eureka-Arcata Corridor Improvement Project would occur under any one of the Build Alternatives. Alternative 7 is the No-Build Alternative. Under the No-Build Alternative, none of the project features would be constructed.

Activity from construction would increase noise levels at locations immediately adjacent to the project where major construction occurs. The majority of construction would occur near the Indianola Cutoff under Alternative 2. There were no sensitive receivers (residences) identified in the vicinity of the Indianola Cutoff during the noise monitoring survey. Table 3-24 summarizes typical noise levels generated by construction equipment at a distance of 50-feet. Detailed construction techniques are not yet available. Some construction activities, such as pile driving, have the potential to generate very high noise levels. Noise generated by construction equipment drops off at a rate of 6 dB per doubling of distance. With the implementation of Caltrans standard construction practices, no adverse impacts from construction noise are anticipated.

Table 3-24 Construction Equipment Noise

CONSTRUCTION EQUIPMENT NOISE

Type of Construction Equipment	Maximum Level, dBA at 15 meters
Scrapers	89
Bulldozers	85
Heavy trucks	88
Backhoe	80
Pneumatic tools	85
Concrete Pump	82
Impact Pile Driver	95 to 105

Source: NCHRP, 1999

Construction Noise Impacts to Wildlife

Construction noise levels that may affect wildlife are described based on average (or Leq) and maximum noise levels. Construction areas would be adjacent to Route 101, which would be operational throughout the construction period. Near roadways, Leq noise levels drop off at a rate of about 3 to 5 dBA per doubling of distance. Maximum noise levels, such as those from trucks or motorcycles, drops off at a rate of about 6 dBA per doubling of distance. Noise levels from construction activities would drop off at a rate of about 6 dBA per doubling of distance. Ground absorption, noise shielding features and atmospheric conditions could result in higher drop off rates. With the implementation of Caltrans standard construction practices, no adverse impacts to wildlife are anticipated.

Off-Site Noise Effects

According to the traffic report for this project, any one of the Build Alternatives would increase future traffic volumes along Old Arcata Road, Myrtle Avenue, and the Indianola Cutoff more than the predicted future No-Build scenario (Alternative 7). Existing traffic conditions along these roadways were not available. To evaluate the noise impacts resulting from any one of the Build Alternatives, a comparison of future No-Build Alternative conditions and future project conditions was made. The traffic modeling forecasts indicate Alternative 1 would increase traffic volumes along Old Arcata Road approximately 49 percent over the traffic volumes estimated under Alternatives 3 and Modified Alternative 3A. Alternative 2 would increase traffic volumes approximately 6 percent over Alternative 3.

Residences are located along Old Arcata Road, Myrtle Avenue, and the Indianola Cutoff. A noise measurement survey was conducted to document existing noise conditions at representative noise receivers along these roadways and to serve as a baseline to predict future noise level increases associated with the project. Noise measurements were conducted at five locations along these roadways to quantify existing noise levels generated by vehicular traffic. Table 3-25 summarizes the results of these noise measurements.

The estimated noise level increases resulting from all Build Alternatives on Old Arcata Road, Myrtle Avenue, Indianola Cutoff, and Indianola Road were calculated relative to Alternative 7 (future No-Build). Where noise levels would increase substantially, a substantial noise impact would be identified. Caltrans defines a substantial increase as 12 dBA Leq[hr] or greater. Future traffic noise levels would increase by 0 to 4 dBA under Alternative 1 when compared to the levels predicted for the future No-Build scenario. Alternatives 1A, 2, 3, and Modified Alternative 3A would generate noise levels 0 to 2 dBA higher than future No-Build Alternative conditions. At multiple locations in Table 3-25, the existing worst-hour noise level measurements ranged from 65 to 66 dBA; even increases of 1 to 2 dBA would approach or exceed the noise abatement criteria (NAC) of 67 dBA for residential locations.

Table 3-25 Existing Noise Levels – Off-Site

Site	Location	Type of Development	Noise Abatement Category & Criterion (dBA)	Date	Time	Leq	L(1)	L(10)	L(50)	L(90)	Existing Worst Hour Noise Level, Leq(hr) (dBA)
LT-3	Old Arcata Road North of the Bayside Cutoff ~ 65 feet from the Center of the Near Lane.	Residential	B(67)	6/10/03 to 6/11/03	14:00 to 14:00	--	--	--	--	--	**66**
LT-4	Myrtle Avenue at Rocky Creek Road ~ 100 feet from the Center of the Near Lane.	Residential	B(67)	6/10/03 to 6/11/03	14:00 to 14:00	--	--	--	--	--	**62**
ST-1	Indianola Cutoff west of Indianola Road ~ 80 feet from the Center of the Roadway.	Residential	B(67)	6/10/03	15:30	62.6	72.1	67.2	53.8	43.6	**65**
ST-2	Indianola Road north of Indianola Cutoff ~ 65 feet from the Center of the Roadway.	Residential	B(67)	6/10/03	15:50	47.2	59.1	47.8	43.2	37.7	**50**
ST-7	Old Arcata Road at Golf Course Road ~ 100 feet from the Center of the Old Arcata Road.	Residential	B(67)	6/11/03	10:00	61.1	70.6	66	52.2	39.8	**64**
					10:10	62.1	71	66.8	55.6	43.8	**65**

As a result, noise abatement measures must be considered. Sound walls are the most effective noise abatement measure, but would not be feasible in residential locations with driveways. Overall, changes to noise levels associated with any of the project Build Alternatives would not be considered substantial because project related noise increases would be less than a 12 dBA increase.

AVOIDANCE, MINIMIZATION, AND/OR MITIGATION MEASURES

Preliminary Noise Abatement Analysis

Primary noise impacts associated with the project would result from the potential increase in travel speed[25] along the corridor and additional traffic (not as a result of the project). Substantial noise impacts would not occur at Category B uses along the corridor, but receivers within the Lazy J Trailer Ranch would experience future noise levels that would approach or exceed the NAC. As a result, noise abatement must be evaluated for these receivers.

Under Caltrans and FHWA policies, feasible noise barriers must provide a minimum 5-dBA reduction in traffic noise. Furthermore, under Caltrans policies, noise barriers should interrupt the line of sight between a truck stack (of average height) and a receiver. Chapter 1100 of the Caltrans Highway Design Manual identifies particular design guidelines that must be met for noise barriers, depending on roadway conditions. Under these guidelines, the height of noise barriers is limited to 16 feet, unless constructed within 15 feet of the traveled way where the limit is 14 feet. The most acoustically effective location for a barrier where roadways are elevated above receivers is near the edge of shoulder or top of slope. In this case, the barrier would be located within 15 feet of the traveled way; therefore, would be limited to a maximum height of 14 feet.

A sound wall located along the northbound side of Route 101 could be feasible (i.e., reduce noise levels by 5 dBA and block the line of sight to heavy-duty truck stacks in the near travel lane). This sound wall would benefit approximately 12 to 18 residences in the adjacent mobile home park depending upon the selected barrier height. Since the elevation of Route 101 is above these residences, the sound wall would need to be at the edge of the highway shoulder. The approximate length of this noise barrier would need to be about 590-feet.

A barrier 10-feet high would reduce noise levels by 5 to 8 dBAs at about twelve receivers and block line-of-sight to truck stacks. This would be the minimum height of a feasible sound wall to benefit all impacted receivers. A noise barrier 12-feet high would benefit approximately 18 receivers, providing approximately 5 to 9 dBA of noise reduction. A 14-foot high noise barrier would benefit approximately 18 receivers, reducing noise levels by 6 to 10 dBA. See Table 3-26.

Pursuant to Caltrans and FHWA sound wall policies, a sound wall was determined to be feasible at this location. However, local landowners need to be in agreement with constructing a sound wall. In this case, the property owner of the Lazy J Trailer Ranch, in a personal communication on October 4, 2006, was not in favor of the sound wall. Reasonableness includes opinions of the affected residents, and the trailer park owner does not want a sound wall; therefore, a sound wall for this location would not be constructed.

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[25] The Route 101 posted speed limit near the Lazy J Trailer Ranch will remain 50 mph after construction.

Since construction noise is not expected to be adverse, mitigation for construction noise would not be required.

Table 3-26 Noise Level Reduction with Sound Wall

Location	Alt. 1 2031 Project PM Peak Leq(hr)	Noise Barrier ID or Location	1.8 m Barrier	2.4 m Barrier	3.0 m Barrier	3.6 m Barrier	4.2 m Barrier	4.8 m Barrier	1.8 m Barrier I.L.	2.4 m Barrier I.L.	3.0 m Barrier I.L.	3.6 m Barrier I.L.	4.2 m Barrier I.L.	4.8 m Barrier I.L.
ST-3	68	SW1	64	63	61	60	60	—	4	5	7	8	8	—
ST-4	66	SW1	60	60	59	57	56	—	6	6	7	9	10	—
ST-5	69	SW1	64	64	63	61	61	—	5	5	6	8	8	—
ST-6	66	SW1	62	62	61	60	59	—	4	4	5	6	7	—
R-1	69	SW1	64	63	61	61	60	—	5	6	8	8	9	—
R-2	66	SW1	61	60	60	58	57	—	5	6	6	8	9	—
R-3	62	SW1	59	58	58	56	55	—	3	4	4	6	7	—
R-4	62	SW1	59	58	58	57	56	—	3	4	4	5	6	—
R-5	61	SW1	59	57	57	55	54	—	2	4	4	6	7	—
Location	Alt. 2 2031 Project PM Peak Leq(hr)	Noise Barrier ID or Location	1.8 m Barrier	2.4 m Barrier	3.0 m Barrier	3.6 m Barrier	4.2 m Barrier	4.8 m Barrier	1.8 m Barrier I.L.	2.4 m Barrier I.L.	3.0 m Barrier I.L.	3.6 m Barrier I.L.	4.2 m Barrier I.L.	4.8 m Barrier I.L.
ST-3	69	SW1	65	64	62	61	61	—	4	5	7	8	8	—
ST-4	67	SW1	61	61	60	58	57	—	6	6	7	9	10	—
ST-5	70	SW1	65	65	64	62	62	—	5	5	6	8	8	—
ST-6	67	SW1	63	63	62	61	60	—	4	4	5	6	7	—
R-1	71	SW1	66	65	63	63	62	—	5	6	8	8	9	—
R-2	68	SW1	63	62	62	60	59	—	5	6	6	8	9	—
R-3	63	SW1	60	59	59	57	56	—	3	4	4	6	7	—
R-4	63	SW1	60	59	59	58	57	—	3	4	4	5	6	—
R-5	62	SW1	60	58	58	56	55	—	2	4	4	6	7	—
Location	Alt. 3 and 6 2031 Project PM Peak Leq(hr)	Noise Barrier ID or Location	1.8 m Barrier	2.4 m Barrier	3.0 m Barrier	3.6 m Barrier	4.2 m Barrier	4.8 m Barrier	1.8 m Barrier I.L.	2.4 m Barrier I.L.	3.0 m Barrier I.L.	3.6 m Barrier I.L.	4.2 m Barrier I.L.	4.8 m Barrier I.L.
ST-3	66	SW1	62	61	59	58	58	—	4	5	7	8	8	—
ST-4	64	SW1	58	58	57	55	54	—	6	6	7	9	10	—
ST-5	67	SW1	62	62	61	59	59	—	5	5	6	8	8	—
ST-6	64	SW1	60	60	59	58	57	—	4	4	5	6	7	—
R-1	68	SW1	63	62	60	60	59	—	5	6	8	8	9	—
R-2	64	SW1	59	58	58	56	55	—	5	6	6	8	9	—
R-3	60	SW1	57	56	56	54	53	—	3	4	4	6	7	—
R-4	60	SW1	57	56	56	55	54	—	3	4	4	5	6	—
R-5	59	SW1	57	55	55	53	52	—	2	4	4	6	7	—

Notes: Noise barriers should not exceed 4.3 m in height when located 4.5 m or less from the edge of the traveled way, and should not exceed 5.0 m in height above the ground line when located more than 4.5 from the traveled way.

I.L. = Barrier insertion loss or noise level reduction due to a barrier.

3.2.8 Energy

REGULATORY SETTING

The National Environmental Policy Act (NEPA) (42 United States Code [USC] Part 4332) requires the identification of all potentially significant impacts to the environment, including energy impacts.

The California Environmental Quality Act (CEQA) Guidelines, Appendix F, Energy Conservation, state that EIRs are required to include a discussion of the potential energy impacts of proposed projects, with particular emphasis on avoiding or reducing inefficient, wasteful and unnecessary consumption of energy.

NOTE: Greenhouse gas emissions and climate change issues are discussed in Chapter 4 – California Environmental Quality Act (CEQA) Evaluation.

AFFECTED ENVIRONMENT

In California, the vast majority of energy consumed originates from nonrenewable sources. Approximately 60 percent of the State's energy is derived from petroleum; while 27 percent is from natural gas; 10 percent from hydroelectric, geothermal, nuclear, and other sources; and three percent from coal. Of all the energy consumed, 48 percent is used for transportation, 31 percent for industrial use, 12 percent for residential use, and 9 percent for commercial use (CEC 1993). These statistics show that the consumption of petroleum for transportation is the primary use of nonrenewable energy in the state.

One of the focuses on conservation of energy has, therefore, been on reducing the energy consumed by transportation, primarily automobile traffic. Conservation objectives have included improving the efficiency of the transportation mode, such as the United States Environmental Protection Agency (EPA) fleet requirements for improving fuel efficiency of personal automobiles. Other conservation strategies include encouragement of high-occupancy vehicle use, improved road construction and maintenance, and traffic flow improvements.

An energy analysis was prepared pursuant to 40 CFR 1502.16(e) of the National Environmental Policy Act (NEPA) Guidelines and California Environmental Quality Act (CEQA) Guidelines. NEPA Guidelines state that the Environmental Impact Statement shall include a discussion of "energy requirements and conservation potential of various alternatives." Appendix F of the CEQA Guidelines states that in Environmental Impact Reports, "alternatives should be compared in terms of overall energy consumption and in terms of reducing wasteful, inefficient, and unnecessary consumption of energy."

ENVIRONMENTAL CONSEQUENCES

Energy use was evaluated for both project construction and post-construction energy consumption. The evaluation included the three major routes linking Eureka and Arcata: Route 101, Old Arcata Road, and State Route 255 (Samoa Boulevard).

Since none of the proposed Build Alternatives would increase highway traffic carrying capacity (i.e., adding additional through lanes to accommodate higher traffic volumes), the proposed project would not substantially increase fuel consumption (energy use). However, all Build Alternatives would, to varying degrees, result in out-of-direction travel compared to the No-Build condition because the Route 101 median accesses would all be restricted or controlled. The increase in out-of-direction travel would in turn result in a net increase of energy consumption compared to the No-Build Alternative. (For more information regarding traffic effects, see Chapter 3, Section 3.1.6 Traffic and Transportation.)

Depending on the alternative, the increase in traffic volume on Route 101 for both the existing condition and the year 2041 would range from no change to a 7 percent increase for Alternative 1. Alternative 1 would result in the highest projected out-of-direction travel because it closes all medians without signalization, turnarounds, or a grade separation (interchange). Modified Alternative 3A, identified as the Preferred Alternative, is predicted to increase traffic volume on Route 101 by 1 percent for both years 2013 and 2041.

Vehicle miles traveled (VMT) and gallons of fuel consumption provide other metrics to evaluate changes in energy consumption. VMT is calculated by multiplying the daily traffic volume on a roadway segment by the length of the segment. Gallons of fuel consumed per day is calculated from the VMT.[26] The No-Build Alternative VMT calculation for year 2013 on Route 101 between Cole Avenue and Bayside Cutoff was 167,700 VMT or 9,047 gallons of fuel consumed per day. By year 2041, the VMT is expected to increase to 237,050 or 12,789 gallons per day. Consequently, the VMT and fuel consumption would increase over time because of the projected increase in traffic volumes, independent of the project. (Changes in gallons per day for each Build Alternative were not available; however, in Table 3-27 the percentage of changes in highway volume for each Build Alternative provide an approximate energy use comparison.)

[26] A common unit of energy when discussing transportation energy is the British thermal unit (Btu). A Btu is the quantity of heat required to raise the temperature of 1 pound of water 1 degree Fahrenheit at sea level. The conversion of VMT to Btu is 6,226 Btu/VMT. The conversion of Btu to gallons of fuel is 115,400 Btu/gallon. The conversion of the Btu energy value to volumes of fuel is a very rough conversion. The factor used in this conversion represents an average value for automobiles in the United States automobile fleet in 2000. This conversion does not represent an actual value of gasoline volume that would be consumed in the year 2041 because it does not account for likely changes in automobile fuel usage or fuel sources. Gallons of engine fuel are used as an energy unit as a point of comparison because it is generally a more tangible unit value than British thermal units.

Table 3-27 summarizes the predicted net increase in traffic for the Build Alternatives compared to the No-Build condition. Net increase on the roadways would be directly proportional to energy consumption, compared to the No-Build Alternative condition. Note that since the volumes on Route 101 are much higher than Old Arcata Road and State Route 255, traffic volume changes on Route 101 have a much higher magnitude compared to the local roads.

Table 3-27 Projected increase in traffic volumes for all Build Alternatives as compared to the No-Build Alternative within the Eureka-Arcata Corridor for both year 2013 and year 2041

	Alternative				
	1	**1A**	**2**	**3**	**Modified 3A**
Route 101	7%	0%	6%	1%	1%
Route 255	0%	15%	6%	1%	1%
Old Arcata Road	60%	10%	7%	-2%	-2%

For the proposed project, an adverse impact for energy consumption would occur if a project alternative would result in a substantial increase in energy consumption over the No-Build Alternative, or if a project alternative would result in a wasteful, inefficient, and unnecessary consumption of energy. Based on the increase in traffic volume percentages shown in Table 3-27, the increase in energy consumption under Alternatives 1, 1A, and 2 over the No-Build Alternative would be considered an adverse, but not substantial impact. Alternative 3 and Modified Alternative 3A would have minimal or no increase in energy consumption compared to the No-Build Alternative.

All Build Alternatives would improve intersection level-of-service compared to the existing condition where traffic queues often form at the local street and driveway intersections on Route 101. In other words, motor vehicles stopping and accelerating at the existing intersections result in higher energy consumption compared to motor vehicles traveling at constant speeds under the Build Alternatives.

Although all Build Alternatives would result in an increase in energy consumption compared to the No-Build Alternative, none of the Build Alternatives would result in wasteful, inefficient, or unnecessary uses of energy. The proposed project Alternatives are primarily needed for traffic safety improvement, traffic operation, and long-term roadway maintenance along Route 101. Alternatives that could potentially reduce energy consumption (such as improving public transit) did not meet the project need and purpose (see Chapter 2 for more information).

Construction Energy

Construction of the proposed project would require the expenditure of energy for building the proposed project, manufacturing the materials used in construction, and transporting these materials to the construction area. The energy requirements for construction of the Build Alternatives were calculated based on guidelines provided in the *Energy and Transportation Systems* Caltrans report. The “input-output” method, described in the *Energy and Transportation Systems* report, would be the most appropriate method to conduct these analyses. The estimated monetary cost of construction for all Build Alternatives serves as the necessary input for estimating construction energy usage. Based on construction cost estimates, Build Alternative 3 would result in the most energy used of the proposed project alternatives. Alternative 2 would be 1.2 times less than Alternative 3. Energy requirements for Modified Alternative 3A would be slightly less than Alternative 2. The construction of Alternative 1 would require 166 times less energy than Alternative 3. Alternative 1A energy needs would be approximately midway between Alternative 1 and Modified Alternative 3A. The construction of the proposed project would be a necessary component of the project and a one-time expenditure of energy. In addition, the operation of the proposed project would not result in a wasteful, inefficient, and unnecessary use of energy. Therefore, construction energy impacts would not be adverse.

AVOIDANCE, MINIMIZATION, AND/OR MITIGATION MEASURES

A measure to reduce energy consumption for any one of the proposed Build Alternatives would be to expand mass transit options along Route 101 between Eureka and Arcata. The concept was discussed for this project corridor in the Caltrans Value Analysis Study Report (VAR) as Alternative 3.0. According to the VAR, expanding mass transit would result in a reduction in energy use in this corridor. The VAR discusses several difficulties that would exist and must be overcome for this mitigation to be realized. These difficulties include establishing political support, agency support, public support, and business support to introduce disincentives for use of single occupancy vehicles in this corridor and incentives for users of public transit. State funding would be required to acquire buses, expand facilities, and meet the increased mass transit operation costs. There would be environmental impacts for constructing parking lots, constructing parking structures, and from the expansion of mass transit facilities. General Plans for Humboldt County and the local municipalities would need to include Land Use Elements that promote land-use patterns that encourage mass transit use. Caltrans cannot guarantee the feasibility and/or implementation of this measure because this requires effort by other jurisdictions that may decide against implementing the necessary steps required. Additionally, it is not known if this measure would fully offset energy effects under any of the Build Alternatives because the level of success would be unknown until implementation. Therefore, this measure would not be feasible.

Although not included in this project, public agencies and governments are planning and implementing measures to reduce vehicle travel as well as raising motor vehicle efficiency. These efforts are expected to reduce overall energy consumption for transportation.

On November 14, 2013, the California Coastal Commission voted to approve Federal Coastal Consistency Certification for the proposed project with a coastal trail planning condition: *"Construction of the Route 101 Corridor Improvements will not commence until adequate commitments are in place to assure that a separate Class 1 bike and pedestrian trail, parallel to Route 101 from Arcata to the northern end of downtown Eureka, will be constructed and operational by the time the major project components are completed."*

See the Land Use section in this chapter for more information. A trail for non-motorized transit is expected to reduce transportation related energy consumption between Eureka and Arcata.

Overall, during and after construction, none of the project Alternatives would result in a wasteful, inefficient, and unnecessary consumption of energy.

3.3 Biological Environment

This section consists of summaries from the January 2007 Natural Environment Study, the May 2016 Natural Environment Study, the 2006 Draft Conceptual Wetland Mitigation Plan, and the January 2016 Humboldt Bay Area Mitigation (HBAM) Concept Design Report.

3.3.1 Natural Communities

REGULATORY SETTING

This section of the document discusses natural communities of concern. The focus of this section is on biological communities, not individual plant or animal species. Biological communities are populations of plants and animals living and interacting within the project area. This section also includes information on wildlife corridors, fish passage, and habitat fragmentation. Wildlife corridors are areas of habitat used by wildlife for seasonal or daily migration. Habitat fragmentation involves the potential for dividing sensitive habitat, thereby lessening its biological value.

Habitat areas that have been designated as critical habitat under the Federal Endangered Species Act are discussed in the Threatened and Endangered Species Chapter 3, Section 3.3.5. Wetlands and other waters are discussed in Chapter 3, Section 3.3.2.

AFFECTED ENVIRONMENT

In order to accurately assess the project's potential impacts to the biological setting, a Biological Study Area (BSA) was established. The BSA consists of the area between the existing railroad west of Route 101 and tidally influenced brackish sloughs east of Route 101. The southern study limit is the Eureka Slough and northern study limit is the 11th Street overcrossing structure in Arcata. (See Plan Sheets in Appendix A.) The study area is expected to encompass all potential temporary and permanent project effects.

In addition to the habitats within the study area, there are regional habitats of concern in the vicinity of the study area. One of the three largest stands of eelgrass on the West Coast occurs in the intertidal mud flats of Arcata and Humboldt Bay. Eelgrass beds are important habitat for fish and invertebrates and influence the sediment transport and deposition in the bay. Northern coastal dune communities occur on the western side of Arcata and Humboldt Bay, willow swamps (scrub-shrub wetlands) occur on both sides of the bay, and forest communities (riparian, mixed, and coniferous) occur on the eastern side of Arcata and Humboldt Bay. The Jacoby Creek and Gannon Slough watersheds, habitat for salmonids and tidewater goby, drain into the BSA. (For more information regarding the hydrology of the project area, refer to Chapter 3, Section 3.2.1 Hydrology and Floodplain.)

Four designated wildlife areas and refuges are located adjacent to, or within the BSA (see Plan Sheets in Appendix A):

- Humboldt Bay National Wildlife Refuge is managed by the U.S. Fish and Wildlife Service and is located along the Humboldt Bay shoreline west of Route 101 between Eureka and Arcata;

- Fay Slough Wildlife Area is managed by the California Department of Fish and Wildlife (CDFW) and is located between Indianola Cutoff and Airport Road east of Route 101;

- Eureka Slough Wildlife Area is also managed by CDFW and is at the western end of Jacobs Drive on the eastern side of Route 101;

- Bracut Marsh was established by the California Coastal Conservancy and Redwood Community Action Agency. This marsh is located west of Route 101 at the northwest corner of the Bracut Industrial Park.

These wildlife areas provide wetland habitat including marshes, seasonal wetlands, salt marshes, tidal bay mudflats and open water for thousands of migratory birds along the Pacific Flyway (a north-south migratory corridor).

Surveys and Studies Conducted

A site reconnaissance survey of the southern section of the BSA (to Bayside Cutoff) was completed by URS (URS, a consulting firm, was under contract with Caltrans to survey for this project) on February 24 through 26, 2003. The survey covered the entire BSA and recorded habitat types, plant and animal species present, and environmental conditions. The area included the shoulder of the south and northbound lanes of the Route 101 right-of-way and the medians. Caltrans Biologist Gail Popham surveyed the section from Bayside Cutoff north to the 11th Street overcrossing in the winter of 2005-2006 and again in the spring and summer of 2006. Additional seasonally-appropriate floristic surveys were conducted in 2007, 2011 and 2014 to achieve complete coverage of the BSA and/or update prior survey efforts (refer to Chapter 3, Section 3.3.3).

The dominant habitat in the BSA consists of ruderal grassland located along the shoulders of Route 101 and in portions of the median that are not seasonal wetland. An approximately 10-foot wide area is mowed every spring and fall along the Route 101 shoulders and on both sides of the median. Other non-grass species in the ruderal grassland habitat include non-native species such as scarlet pimpernel (*Anagallis arvensis*), black mustard (*Brassica nigra*), fennel (*Foeniculum* vulgare), wild radish *(Raphanus sativus*), bird's-foot trefoil (*Lotus corniculatus*), dandelion (*Taraxacum officinale*), and English plantain (*Plantago lanceolata*). Other non-native plant species that occur in the BSA include Himalayan blackberry (*Rubus armeniacus*), pampas grass (*Cortaderia jubata*), sheet sorrel (*Rumex acetosella*) and dense-flowered cordgrass (*Spartina densiflora*).

The Humboldt Bay area provides habitat for a large diversity of native aquatic and terrestrial animal species. At several locations to the east and west of the BSA, state and national wildlife refuge areas can be found. However, the BSA is dominated by Route 101 and thus does not provide diverse and abundant habitat for wildlife species. The vegetated median and edges of the highway are considered to be of marginal use for most species due to proximity to the highway. While the potential for most of the following species to occur in the BSA is low, mammalian species present in the project vicinity include Roosevelt elk (*Cervus canadensis roosevelti*), black-tailed deer (*Odocoileus hemionus*), gray fox (*Urocyon cinereoargenteus*), raccoon (*Procyon lotor*), opossum (*Didelphis virginiana*), river otter (*Lontra canadensis*), rodents, weasels, skunks, and bats. Bird species include waterfowl (e.g., ruddy duck), wading birds (e.g., great blue heron, egrets, sora rail, black crowned night heron), raptors (e.g., northern harrier), and songbirds (red-winged blackbird, marsh wren, savannah sparrow, barn swallow, cliff swallow). Route 101 is a potential barrier to terrestrial species traveling between the bay and wetland habitats to the east. In the corridor, animal-vehicle collisions are common and primarily involve raccoons, grey foxes, black-tailed deer, opossums and some bird species.

Within the BSA, Jacoby Creek and Gannon Slough serve as migration corridors for anadromous fish (such as salmon) that move between salt and fresh water to complete their life history. These two estuaries also potentially provide resting and feeding habitat for aquatic mammals, migratory waterfowl, and shorebirds. The 101 Slough is a ditch connected to the Eureka Slough on the east side of Route 101, within and adjacent to the BSA. This slough is known to contain tidewater goby, may provide habitat for juvenile salmonids, and provides feeding habitat for migratory waterfowl and shorebirds. However, the 101 Slough does not have suitable salmonid spawning habitat. The brackish waters of the sloughs and watercourses provide potential habitat for special status species such as coastal cutthroat trout, Southern Oregon/Northern California Coast (SONCC) coho salmon, northern California steelhead, California Coastal Chinook salmon, longfin smelt, green sturgeon, Pacific eulachon and tidewater goby. Other fish that were found from surveys conducted on August 31, 2006 in the 101 Slough and Gannon Slough include three-spine stickleback (*Gasterosteus aculeatus*), bay pipefish (*Syngnathus leptorhynchus*), mosquito fish (*Gambusia affinis*), staghorn sculpin (*Leptocottus armatus*), and prickly sculpin (*Cottus asper*).

These regional communities of special concern provide potential habitat for a number of plant and animal species, which are discussed in Chapter 3, Sections 3.3.3, 3.3.4, and 3.3.5.

ENVIRONMENTAL CONSEQUENCES

Route 101 throughout the BSA bisects the wetland habitat of Humboldt Bay. The proposed improvements would neither exacerbate nor alleviate that fragmentation. Proposed roadway median barriers would be the high tension cable barrier design allowing for smaller animals to crawl under and a height of 2.7 feet allowing larger animals to climb or jump over.

Temporary and permanent impacts for the proposed project are expected to occur within the existing Route 101 right-of-way. However, indirect effects (such as construction noise) may extend beyond the Route 101 right-of-way. All Build Alternatives would have minimal to no effect to wildlife using the project area. Due to current high traffic levels, construction activity is not expected to contribute any substantial increase in disturbance to wildlife, such as birds nesting adjacent to the project area. To further minimize noise effects on wildlife, Caltrans would implement standard construction practices, which include noise minimization measures. (For further discussion of noise and listed species, see Chapter 3, Section 3.2.7—Noise and Chapter 3, Section 3.3.5—Threatened and Endangered Species.)

The effects of any of the Build Alternatives to biological resources in the BSA would primarily be due to the loss of wetland habitat within the project footprint and impacts to listed fish due to bridge work. The Build Alternatives can be sorted in ascending order from smallest to largest area of habitat loss as follows: Alternatives 1, 1A, 2, Modified 3A, and 3.

The existing roadway already fragments the wetland habitat and adversely affects wildlife movement. None of the alternatives would involve additional impacts to wildlife corridors and/or increase habitat fragmentation. To minimize potential affects to biological resources, general avoidance and minimization measures would be implemented as part of any one of the Build Alternatives.

Alternative 7, the No-Build, would not result in any additional adverse effects to biological resources; however, the No-Build does not include installation of “fish-friendly” tide gates and rock weir that would enhance tidewater goby and salmonid habitat.

AVOIDANCE, MINIMIZATION, AND/OR MITIGATION MEASURES

To minimize potential adverse effects on biological resources, general avoidance and minimization measures would be implemented as part of any one of the Build Alternatives. General avoidance and minimization measures would be implemented as part of construction activities in order to minimize and avoid impacts to sensitive as well as common biological resources. General avoidance and minimization measures are described below:

- ***Construction Worker Education.*** The pre-job meeting with construction workers would consist of a briefing on environmental issues relative to the proposed project. Information would be provided by a qualified biologist.

- ***Erosion Control.*** Temporary erosion control measures would be implemented at all disturbed areas. Permanent erosion control measures would be implemented upon completion of construction. All disturbed areas would be revegetated with native, non-invasive plant species or non-persistent plant hybrids that would serve to stabilize site conditions and prevent invasive plant species from colonizing. (See Chapter 3, Section 3.2.2 for more information regarding erosion control.)

- ***Environmentally Sensitive Areas.*** Caltrans would establish and indicate Environmentally Sensitive Areas (ESAs) on project plans and specifications to avoid potential construction impacts to sensitive biological resources (rare plant populations) located within and adjacent to the construction corridor. Temporary exclusionary fencing would be placed around populations of special status plant species prohibiting construction activities in those areas.

- ***Construction Monitoring.*** Caltrans would have a qualified biologist as needed to monitor construction activities in sensitive biological resource areas (see the NES for a description of these areas) to ensure compliance to resource agency permits and compliance to avoidance and minimization requirements.

- ***Compliance with Migratory Bird Treaty Act.*** To minimize impacts to cliff and barn swallows in compliance with the Migratory Bird Treaty Act, measures such as exclusionary netting or nest removal every 2-3 days would be implemented during the breeding season (March 1 – September 1). It is likely that other species of migratory birds may be nesting in the BSA. To avoid adverse effects to these birds, the removal of any suitable nesting habitat (grasses, shrubs and trees) would take place between September 1st and March 1st, outside the nesting season, or following field survey work by a qualified biologist with non-nesting documentation.

3.3.2 Wetlands and Other Waters

REGULATORY SETTING

Wetlands and other waters are protected under a number of laws and regulations. At the federal level, the Federal Water Pollution Control Act, more commonly referred to as the Clean Water Act [CWA (33 USC 1344)], is the primary law regulating wetlands and surface waters. The CWA regulates the discharge of dredged or fill material into waters of the United States (U.S.), including wetlands. Waters of the U.S. include navigable waters, interstate waters, territorial seas, and other waters that may be used in interstate or foreign commerce. To classify wetlands for the purposes of the CWA, a three-parameter approach is used that generally requires the presence of hydrophytic (water-loving) vegetation, wetland hydrology, and hydric soils (soils formed during saturation or inundation). All three parameters must be present, under normal circumstances, for an area to be designated a jurisdictional wetland under the CWA.

Section 404 of the CWA establishes a regulatory program that provides that discharge of dredged or fill material cannot be permitted if a practicable alternative exists that is less damaging to the aquatic environment or if the Nation's waters would be significantly degraded. The Section 404 permit program is run by the U.S. Army Corps of Engineers (USACE) with oversight by the U.S. Environmental Protection Agency (USEPA).

This project would also require a Section 10 (of the Rivers and Harbors Act) permit from the USACE for the construction of any structure in, or over any navigable water of the United States, the excavating from or depositing of material in such waters, or the accomplishment of any other work affecting the course, location, condition, or capacity of such waters.

USACE issues two types of 404 permits: Standard and General Permits. Nationwide permits, a type of General permit, are issued to authorize a variety of minor project activities with no more than minimal effects.

Ordinarily, projects that do not meet the criteria for a Nationwide Permit may be permitted under one of USACE's Standard permits. For Standard permits, the USACE decision to approve is based on compliance with USEPA's Section 404(b)(1) Guidelines (USEPA 40 CFR Part 230), and whether permit approval is in the public interest. The Section 404 (b)(1) Guidelines were developed by the USEPA in conjunction with USACE, and allow the discharge of dredged or fill material into the aquatic system (Waters of the U.S.) only if there is no practicable alternative which would have less adverse effects. The guidelines state that USACE may not issue a permit if there is a least environmentally damaging practicable alternative (LEDPA) to the proposed discharge that would have fewer effects on Waters of the U.S., and not have any other significant adverse environmental consequences.

Caltrans, the Federal Highway Administration (FHWA), the U.S. Army Corps of Engineers (USACE), the United States Environmental Protection Agency (USEPA), and United States Fish and Wildlife Service (USFWS) entered into a memorandum of understanding (MOU) to integrate the National Environmental Policy Act (NEPA) and the Clean Water Act (CWA) for Environmental Impact Statement (EIS) projects that have five or more acres of permanent impact to Waters of the U.S. (United States) . Under this MOU, the signatory agencies agree to coordinate at three checkpoints: 1) need and purpose, 2) identification of range of alternatives, and 3) preliminary determination of the least environmentally damaging practicable alternative (LEDPA) and conceptual mitigation plan. The goal of the MOU process is to allow the USACE to more efficiently adopt the EIS for their Section 404 permit action.

The Executive Order for the Protection of Wetlands (E.O. 11990) also directs the activities of federal agencies with regard to wetlands. Essentially, this executive order states that a federal agency, such as FHWA and/or Caltrans, as assigned, cannot undertake or provide assistance for new construction located in wetlands unless the head of the agency finds: 1) that there is no practicable alternative to the construction and 2) the proposed project includes all practicable measures to minimize harm.

At the state level, wetlands and waters are regulated primarily by the California Department of Fish and Wildlife (CDFW), the State Water Resources Control Board (SWRCB) and the Regional Water Quality Control Boards (RWQCB). In certain circumstances, the California Coastal Commission may also be involved. Sections 1600-1607 of the California Fish and Game Code require any agency that proposes a project that will substantially divert or obstruct the natural flow of, or substantially change the bed or bank of a river, stream, or lake, to notify CDFW before beginning construction. If CDFW determines that the project may substantially and adversely affect fish or wildlife resources, a Lake or Streambed Alteration Agreement will be required. CDFW jurisdictional limits are usually defined by the tops of the stream or lake banks, or the outer edge of riparian vegetation, whichever is wider. Wetlands under jurisdiction of the USACE may or may not be included in the area covered by a Streambed Alteration Agreement obtained from the CDFW.

The RWQCBs were established under the Porter-Cologne Water Quality Control Act to oversee water quality. Discharges under the Porter-Cologne Act are permitted by Waste Discharge Requirements (WDRs) and may be required even when the discharge is already permitted or exempt under the CWA. In compliance with Section 401 of the CWA, the RWQCBs also issue water quality certifications for activities which may result in a discharge to Waters of the U.S. This is most frequently required in tandem with a Section 404 permit request. (See Chapter 3, Section 3.2.2—Water Quality for additional details.)

Since this project is within the Coastal Zone, the California Coastal Commission, as well as the County of Humboldt, the City of Eureka and the City of Arcata, would also regulate coastal wetlands. In California, lands within the Coastal Zone that exhibit even a single wetland parameter or characteristic (sufficient hydrology, hydric soil, or predominance of hydrophytic vegetation) are deemed wetland by the California Coastal Commission. Coastal wetlands are inclusive of USACE wetlands. Less-than-three parameter wetlands are present in the project area at the upland edges of the Estuarine Intertidal Scrub/Shrub Wetland (within the highway median and right-of-way).

AFFECTED ENVIRONMENT

Physical Conditions

The Biological Study Area (BSA) parallels the eastern margin of Humboldt Bay. The bay is 14 miles long and 4.5 miles wide at the widest point, with an area of 24.1 square miles at mean high tide. The Bay is shallow and has extensive mudflats interlaced with drainage channels and a few major shipping channels. The subwatershed that drains to Humboldt Bay is 223 square miles along the foothills of the Coast Range. Fresh water enters the bay from Jacoby Creek, Elk River, Freshwater Creek/Eureka Slough, McDaniel Slough, Mad River Slough, Gannon Slough and other small sloughs and creeks. The BSA begins east of Eureka Slough. No construction would occur along the Eureka Slough bridge. The northern terminus of the BSA is located immediately below the 11th Street overcrossing. The bay side of Route 101 is located close to salt marshes and intertidal mud flats, while the eastern edge of Route 101 borders agricultural land.

Jacoby Creek flows under Route 101 just north of the Bayside Cutoff. It originates in the Coast Range just southwest of Kneeland and flows northwest for about ten miles to its outlet at Humboldt Bay south of Arcata. The upper reaches of Jacoby Creek provide spawning habitat for salmonids. The estuary provides habitat for tidewater goby as well as Southern Oregon/Northern California Coast (SONCC) ESU coho salmon (*Oncorhynchus kisutch*), California Coastal Chinook salmon ESU (*Oncorhynchus tshawytscha*), northern California steelhead ESU (*Oncorhynchus mykiss*), and coastal cutthroat trout (*Oncorhynchus clarkii clarkii*); the first four of which are federally-listed species. Gannon Slough flows under Route 101 just north of Jacoby Creek. It originates about two miles north in Arcata and extends south along the right side of northbound 101 to its outlet into Humboldt Bay just north of Jacoby Creek.

Gannon Slough and its tributaries (Beith, Campbell, and Grotzman Creeks) also provide habitat for tidewater goby, coho salmon, Chinook salmon, steelhead, and coastal cutthroat trout. Figure 3-1 illustrates the BSA along Route 101 on aerial photographs.

The BSA was historically tidal wetlands. The process of diking tidal wetlands for conversion to agricultural uses began in the 1880s. The conversion of wetlands to pasture land was accelerated by construction of the Northwestern Pacific Railroad in 1901 and subsequent placement of tide gates, which further restricted tidal influence over adjacent lands. The low-lying areas became seasonally saturated freshwater marshes or agricultural wetlands dominated by exotic pasture grasses.

Soil survey data from the Natural Resources Conservation Service (NRCS) indicates that un-filled portions of the BSA support the Occidental, 0 to 2 percent slopes soil series. These soils are composed of poorly drained silty clay loam with or without a thin organic peat layer on the surface. The parent material is alluvium derived from mixed sources *(Source: USDA NRCS, 2014).*

The climate in the vicinity of the BSA is typically mild and wet during fall and winter and cool and dry during spring and summer. Annual rainfall in Eureka is 39 inches, most of which falls between October and May.

Jurisdictional Wetlands

Wetlands are natural communities of special concern and are considered sensitive because they are of limited distribution in California, they provide important habitat for wildlife and special-status species, and perform important flood protection and pollution control functions. Jurisdictional wetlands or other Waters of the U.S. are regulated by state and federal agencies. Wetlands and other Waters of the U.S. in the BSA were delineated (methodically identified according to established protocol) in spring 2002. Caltrans received final wetland jurisdictional determination from the USACE, including wetland delineation verification, on May 24, 2006. The delineation was re-verified by the USACE in March 2011. Caltrans is in the process of re-verifying the wetland delineation again, and sent the USACE a re-verification request in August 2016. The locations of potential jurisdictional wetlands and other waters are shown on the Wetland Plan Sheets in Appendix A. The photographs in Figure 3-26 show wetlands within the project limits.

Since the BSA is adjacent to Humboldt Bay and lies in the California Coastal Zone, wetlands present in this area are also under the jurisdiction of the California Coastal Commission (CCC). The definition of a wetland by CCC and California Department of Fish and Wildlife (CDFW) requires only one of the three factors or parameters (sufficient hydrology, hydric soil, or predominance of hydrophytic vegetation) described in the previous Regulatory section. Because of this, the limits of the CCC-determined wetlands may differ from the USACE-determined wetlands. Coastal wetlands are inclusive of USACE wetlands.

Less-than-three parameter wetlands are present in the project area at the upland edges of intertidal wetland (within the highway median and highway right-of-way).

Wetlands and deep water habitat based on the Cowardin classification system (Cowardin 1979) are present in, or immediately adjacent to, the BSA along the edges of the sloughs and within drainage ditches adjacent to Route 101 and are described as follows:

Estuarine Subtidal Unconsolidated Bottom Deepwater Habitat

Estuarine Subtidal Unconsolidated Bottom deepwater habitat is present in the deepest parts of the sloughs in and adjacent to the BSA. These areas include parts of Gannon Slough, Brainard Slough, 101 Slough, Jacoby Creek, and Old Jacoby Creek. They are underwater even at lowest tides, and are subject to both tidal and fresh water influence. South of Airport Road in the 101 Slough, eelgrass (*Zostera marina*) grows below the +1 foot elevation to approximately –1.5 feet, in varying density, depending on tidal velocity, turbidity, or other variables. Tidewater goby and salmonids (family of fish that includes salmon and trout) can be found in these areas.

Estuarine Intertidal Unconsolidated Shore Wetland

Estuarine Intertidal Unconsolidated Shore wetland is present in the sloughs in and adjacent to the BSA. This wetland type is present at the margins of Humboldt Bay, banks of Eureka Slough, Gannon Slough, Jacoby Creek, Brainard Slough, 101 Slough, and Old Jacoby Creek, and are subject to tidal inundation with some fresh water influence. However, they are exposed at low tides. There is also an area of this wetland type in the median between Jacoby Creek and Gannon Slough. This wetland type contains herbaceous, salt-tolerant hydrophytes (plants that grow partly or wholly in water) forming moderate to dense cover. This habitat is usually found in sheltered inland margins of bays, lagoons, and estuaries. The hydric soils are subject to regular tidal inundation by salt water for at least part of each year. Water salinity is greater than or equal to 0.5 parts per thousand. In the BSA, these wetlands have stands of pickle weed (*Salicornia pacifica*) and saltgrass (*Distichlis spicata*). Commonly associated species include jaumea (*Jaumea carnosa*) and arrow-grass (*Triglochin maritima*). At a slightly higher elevation, the diversity of plant species increases and, in addition to the species listed above, these areas may support salt marsh plantain (*Plantago maritima*), sea milkwort (*Glaux maritima*), salt rush (*Juncus lesuerii*), and sandspurry (*Spergularia canadensis* and *S. macrotheca*). Four special status plants, Humboldt Bay owl's-clover, Lyngbye's sedge, western sand spurrey, and Point Reyes bird's-beak, are also associated with the estuarine intertidal wetlands of the BSA.

Palustrine Emergent Wetland

Palustrine Emergent wetland is present within the highway median and along the shoulders on both sides of the highway. This habitat is saturated or intermittently inundated by rainwater run-off. There is no tidal influence. Within the BSA, these wetlands are characterized by plant communities dominated by herbaceous vegetation adapted to seasonally or permanently saturated soils, including sedge or mixed communities containing rush (*Juncus* sp.), silverweed (*Potentilla anserina* ssp. *pacifica*), and bentgrass (*Agrostis stolonifera*). Other species found in this area include arrow-grass, bulrush (*Scirpus* sp.), and yarrow (*Achillea millefolium*).

This wetland type is also present in areas that are continually inundated, such as the 101 Slough north of Mid-City Motor World, the ditch that runs parallel to and between Route 101 and Jacobs Avenue, the California Redwood Company ditch, and the ditches around the Route 101/255 Interchange. Cattails may also make up this freshwater wetland community in monospecific stands, as it is often found in drainage ditches or shores of slow moving creeks. Within the BSA, cattail is abundant in this type of wetland and can be found in water with less than 0.5 parts per thousand salinity (Thunhorst 1993). Testing of the water in the 101 Slough just north of Mid-City Motor World showed a salinity level of less than 0.1 parts per thousand (North Coast Laboratories Ltd. 2005). Emergent vegetation cover (cattails and bulrushes) in these areas is between 5 percent and 90 percent. The water flow is stagnant or very slow and oxygen levels are low.

Additional plants that are found in this wetland community include water parsley (*Oenanthe sarmentosa*), marsh pennywort (*Hydrocotyle* sp.), rush (*Juncus* sp.), bulrush, sedge, and buttercups (*Ranunculus* sp.).

Wetland Functions

Wetland ecosystems possess unique functions and values that vary depending on the type of wetland, its size, surrounding land uses, and the degree to which it has been previously disturbed. Wetland functions are defined as the physical, chemical, and biological attributes of a wetland such as flood storage, wildlife habitat, or groundwater discharge. Other functions of wetlands may have specific “values” that are considered beneficial to society such as groundwater recharge, recreation, or aesthetics.

Each wetland type was evaluated separately to determine general wetland functions and values. Categories of wetland functions and their evaluation criteria were based on the Wetland Evaluation Technique (WET) developed jointly by the USACE for the FHWA (Adamus et al. 1987). This document describes a qualitative approach that addresses each of the following standard functions for each wetland type:

- Groundwater recharge
- Groundwater discharge
- Flood flow alteration
- Sediment/toxicant retention

- Nutrient removal/transformation
- Production export
- Wildlife diversity/abundance
- Aquatic diversity/abundance
- Uniqueness/heritage
- Recreation, open space, visual quality

Functions and values of the wetlands in the BSA were evaluated based on field observations and other available data. Results of other project-related studies were used to assess some of the potential functions such as habitat and water quality. Specific criteria used to evaluate the functions and values of the wetlands included wetland condition, whether the wetland was natural or artificial, commonness or rarity, and presence or absence of sensitive species, size, magnitude of potential impacts, and the regional status of the wetland type.

This analysis is based on the premise that wetland functions are related to the wetland types. Other factors that affect the functional assessment of wetland types are vegetative development of the wetland site, barriers between a wetland and adjoining uplands, and adjacent land uses. Factors that affect the social significance, or value, of a wetland include the presence of one or more of the following: a special status species, significant archeological resources, "unique" wetland types, a source of drinking water, or publicly owned lands designated for conservation, preservation, or research.

The probability that a particular wetland type performs a specific function was assessed using the Wetland Evaluation Technique (WET) as a guideline. This approach assigns a value of High, Moderate, or Low depending on the presence or absence of certain indicators of wetland function (e.g., a value of "high" means there is a high probability that the wetland performs a particular function). Table 3-28 presents the criteria defined for WET assessments. This wetland evaluation technique was supplemented with site-specific details for the BSA.

The single Cowardin deepwater habitat (i.e., Waters of the U.S.) in the BSA is represented by Estuarine Subtidal Unconsolidated Bottom associated with the permanently flooded portions of Gannon Slough, Brainard Slough, 101 Slough, Jacoby Creek and Old Jacoby Creek. These areas are always underwater. Within the BSA this habitat has moderate overall function and value due to the presence of listed fish species. Additional details of potential impacts to these waters and minimization measures are detailed in Chapter 4 of this document.

The two Cowardin wetland systems in the BSA include Estuarine Intertidal Unconsolidated Shore and Palustrine Emergent wetlands. Estuarine Intertidal Unconsolidated Shore wetlands within the BSA occur at the 101 Slough, Gannon Slough, Eureka Slough, Jacoby Creek, Brainard Slough, Old Jacoby Creek and along the margins of Humboldt Bay. This wetland type is found on the banks of the estuarine deepwater habitats that are exposed at low tide. A portion of the median between Jacoby Creek and Gannon slough is also this type of wetland. Within the BSA, this type of wetland has moderate overall function and value (Table 3-28). Disturbance to this wetland type would include the bridge work and replacement of the tide gates; however, this work would be done at low tide, with additional measures taken to minimize impact.

Palustrine Emergent Wetlands within the BSA occur at the California Redwood Company ditch, the Jacobs Avenue ditch, the northern section of the 101 Slough (Mid–City Motor World north to Bracut) and the watercourses at the Route 101/255 interchange. These areas are fed by rainwater and are drained to the inland side of Route 101 by a number of culverts throughout the BSA. These areas are characterized by year-round standing water with minimal flushing flow and salinity less than 0.5 parts per thousand. The habitat is anaerobic and vegetated primarily by cattails and bulrushes. The Palustrine Emergent Wetland present in the study area is considered to have moderate function and value (Table 3-28).

Additional Palustrine Emergent Wetland occurs in areas along the existing transportation right-of-way and within the median that are routinely mowed. These wetland areas have generally moderate functions and values due to their proximity to the road and their isolation from the bay. Flood flow alteration is low to moderate due to the capacity to delay runoff from the highway. All other functions listed in Table 3-28 are low-moderate due to the mowing and location adjacent to the highway. This area is vegetated primarily by herbaceous vegetation. These areas are saturated or intermittently inundated by rainwater.

In California, lands within the Coastal Zone that exhibit a single wetland parameter (wetland hydrology, hydric soil, predominance of hydrophytic vegetation) are deemed wetland under the authority of the California Coastal Commission. Coastal wetlands are inclusive of USACE wetlands. Less-than-three parameter wetlands are present in the project area at the upland edges of the Estuarine Intertidal Emergent Wetland (within the highway median and right-of-way).

Wetland Values

Wetland values refer to the benefits that wetlands provide to the environment or people and include ecological, social, or economic values. Wetland ecosystems possess unique functions and values that vary depending on the wetland type, its size, surrounding land uses, and the degree to which it has been previously disturbed. Wetland functions are defined as the physical, chemical and biological attributes of a wetland which include groundwater recharge, floodwater storage, sediment/toxicant retention, nutrient removal/transformation, aesthetics, wildlife diversity and abundance, and aquatic diversity and abundance. Other functions of wetlands may have specific “values” that are considered beneficial to society such as groundwater recharge, recreation, or aesthetics. The functions and values of these wetland types are discussed in Table 3-28. All surface waters in the BSA flow into Humboldt Bay.

Table 3-28 Summary of Wetland Functions and Values within the Project Biological Study Area				
Function / Value	**Criteria**	**Estuarine Subtidal Waters**	**Estuarine Intertidal Wetland**	**Palustrine Emergent Wetland**
Groundwater recharge	*High:* groundwater table slopes away from wetland, non-riparian, not permanently inundated. *Low:* wetlands with impervious underlying strata or marine/estuarine wetlands.	Low (1) Rationale: Marine/ estuarine wetlands.	Low (1) Rationale: Marine/ estuarine wetlands.	Moderate (2) Rationale: Not permanently inundated, groundwater table mostly influenced stormwater runoff.
Groundwater discharge	*High:* permanently inundated, below dam/impoundment, outlets but no defined inlet, presence of springs. *Low:* rated "High" for groundwater recharge, non-permanently flooded wetlands lacking the "High" characteristics defined above.	Moderate (2) Rationale: Permanently inundated. Inlet well defined. Sloughs and Jacoby Creek	Low (1) Rationale: Not permanently inundated. Defined inlet and outlet.	Moderate (2) Rationale: Most areas not permanently inundated. Non-riparian. No defined inlet, weakly defined outlet.
Flood flow alteration	*High:* regulated reservoir, outflow less than inflow, non-tidal, capacity to delay runoff (depression). *Low:* permanently inundated (i.e., less capacity), no potential for ponding, all tidal wetlands.	Low (1) Rationale: Tidal wetlands, low capacity. Sloughs and Jacoby Creek	Low (1) Rationale: Tidal wetlands, low capacity.	Low (1) - Moderate (2) Rationale: Most areas not permanently inundated. In 101 Slough outflow slow. In median, capacity to delay runoff.
Sediment Stabilization	*High:* potential erosive forces present, canals/levees present that confine water, high water velocity, evidence of long-term erosion, and presence of water and vegetation interspersion. *Low:* no flowing water, no open water wider than 100 feet, no eroding areas abutting the wetland, no vegetation or rubble.	Moderate (2) Rationale: Flowing water fluctuating with tides, but no open water wider than 100-feet, no vegetation or rubble.	Moderate (2) Rationale: Jacoby and Gannon canals present that confine water, low water velocity, tidal fluctuation.	Moderate (2) Rationale: In median- well vegetated, no flowing water, no open water wider than 100-feet.

Table 3-28 Summary of Wetland Functions and Values within the Project Biological Study Area				
Function / Value	**Criteria**	**Estuarine Subtidal Waters**	**Estuarine Intertidal Wetland**	**Palustrine Emergent Wetland**
Sediment/ toxicant retention	*High:* potential for erosion or toxicants in the watershed combined with capacity to confine or impound water; no outlet (or constricted), riffle and pool complexes, erect vegetation. *Low:* no flowing water, no open water, > 100 feet wide, or no vegetation; immediately downstream of impoundment, high-velocity flows, tidal flows.	Moderate (2) Rationale: Flows fluctuating with tides, > 100 feet wide, or no vegetation. Sloughs and Jacoby Creek	Low (1); Rationale: Tidal flows. No open water > 100-feet wide and little vegetation.	Low (1) to Moderate (2) Rationale: In median, low flowing water, no open water > 100 feet wide. Water confined, vegetation present.
Nutrient removal/ transformation	*High:* same as for sediment/toxicant retention (capacity to confine or impound water; no outlet, constricted, riffle and pool complexes, erect vegetation). *Low:* low sediment trapping, peat sediments, anoxic water column, marine wetlands.	Low (1) Rationale: Flows fluctuating with tides, little vegetation. Sloughs and Jacoby Creek	Low (1) Rationale: Outlet flows fluctuating with tides, marine wetlands.	Low (1) to Moderate (2) Rationale: In median, low flowing water, no open water, > 100 feet wide.
Production export	*High:* high primary productivity and high water velocity; Riverine wetlands with eutrophic conditions. Marine or estuarine with high primary productivity or eutrophic conditions. *Low:* no permanent or intermittent outlets.	High (3) Rationale: Estuarine with high primary productivity. Sloughs and Jacoby Creek	High (3) Rationale: High primary productivity of brackish marsh vegetation and outlet.	Low (1) Rationale: No permanent or intermittent outlets.
Wildlife diversity/ abundance	*High*: riparian wetlands, floodplain wetlands, high vegetation diversity, wetland-upland complexes, large and diverse wetlands. *Low:* isolated wetlands within urbanized areas, lack of connecting corridors, small wetlands with low vegetation diversity.	Moderate (2) to High (3) Rationale: Moderate wildlife and plant diversity, fairly high diversity of bird species, some special status species present.	High (3) Rationale: Fairly high diversity of bird species. Rare plants present at Jacoby Creek and Gannon Slough.	Low (1) Rationale: Isolated wetlands within urbanized areas, lack of connecting corridors, low vegetation diversity.

Table 3-28 Summary of Wetland Functions and Values within the Project Biological Study Area				
Function / Value	**Criteria**	**Estuarine Subtidal Waters**	**Estuarine Intertidal Wetland**	**Palustrine Emergent Wetland**
Aquatic diversity/ abundance	*High:* regularly flooded, erect vegetation, adequate levels of dissolved oxygen, diverse vegetation cover providing partial shading. *Low:* substrate of bedrock or rubble, farmed, acidic surface water.	High (3) Rationale: Diverse fish species present. Habitat, nursery, and refuge areas for fish.	High (3) Rationale: Diverse fish species present. Habitat, nursery, and refuge areas for fish.	Low (1) Rationale: 101 Slough poor fish habitat due to low O_2. Median /shoulders insufficient water for aquatic species.
Uniqueness/ heritage	*High:* presence of special status species, significant archeological resources, "unique" wetland types, or publicly owned lands designated for conservation, preservation, or research. *Low:* absence of criteria listed above.	High (3) Rationale: Potential presence of special-status species. Area is adjacent to the CDFW Eureka Slough Wildlife Area.	High (3) Rationale: Adjacent to the publicly owned Wildlife Areas. Rare plants present.	Low (1) Rational: In median, not a unique wetland type, not designated for conservation.
Recreation	*High:* wetlands utilized and accessible for recreation. *Low:* wetlands not utilized or accessible for recreation.	Low (1) Rationale: Sloughs and Jacoby Creek along Route 101 not utilized or accessible for recreation.	Moderate (2) Rationale: Public land adjacent to Route 101 used for waterfowl hunting.	Low (1) Rationale: Median /shoulder wetlands not utilized or accessible for recreation.
Summary of Wetland Functions:		**21-22 (Moderate)**	**21 (Moderate)**	**15-17 (Low-Moderate)**

Notes: Functional capacity of wetland types is rated as follows (sum of all functions provided in parentheses):

Low = 1 (11-16)   Moderate = 2 (17-27)   High = 3 (28-33)

ENVIRONMENTAL CONSEQUENCES

Potential project impacts to wetlands and Waters of the U.S. for each Build Alternative have been evaluated, and where feasible, quantified. See Table 3-29. Also see wetland photos in Figure 3-26.

Table 3-29 Wetlands and Waters Impacts (approximate acres) in the Biological Study Area by Alternative

Permanent Impacts	ALTERNATIVE				
	1	1A	2	3	Mod. 3A
Estuarine Subtidal Waters of the U.S.[1]	0.02	0.02	0.02	0.02	0.02
Estuarine Intertidal Wetlands[2]	<0.05	<0.05	<0.05	<0.05	<0.05
3-Parameter Palustrine Emergent Wetlands[3]	2.2	5.6	10.2	7.4	8.1
Total 3-Parameter Wetland Acreage (federal and state jurisdictional wetland)	**2.4**	**5.7**	**10.4**	**7.6**	**8.2**
Additional <3-Parameter Wetland Acreage (state jurisdictional wetland)	**1.3**	**1.7**	**2.1**	**2.2**	**2.0**
Temporary Impacts	**ALTERNATIVE**				
	1	**1A**	**2**	**3**	**Mod 3A**
Estuarine Intertidal Wetlands[4]	<0.1	<0.1	<0.1	<0.1	<0.1
Palustrine Emergent Wetlands[5]	3.8	4.5	5.1	4.8	4.3
Total 3-Parameter Wetland Acreage (federal and state jurisdictional)	**3.9**	**4.6**	**5.2**	**4.9**	**4.4**
Additional < 3-Parameter Wetland Acreage (state jurisdictional wetland)	**0.3**	**0.3**	**0.2**	**0.1**	**0.1**

[1] Subtidal waters of Gannon Slough where rock will be added to construct weir below the triple tide gate.

[2] Intertidal wetlands on the banks of Gannon Slough where RSP will be added in association with weir construction.

[3] Areas of construction and access on roadway shoulders and median.

[4] Temporary impacts to intertidal areas at Jacoby Creek associated with foot traffic and debris containment system during bridge construction and demolition.

[5] Areas temporarily affected by staging on roadway shoulders and median.

For each Build Alternative, permanent wetland impacts are discussed in the following subsection. There would also be temporary impacts during construction for each Build Alternative (see Table 3-29 for areas of temporary impact).

Alternative 1 Impacts

Wetlands that would be impacted by Alternative 1 are primarily Palustrine Emergent Wetlands vegetated for the most part by grasses and other herbaceous vegetation. A total of 2.4 acres of federal USACE jurisdictional and an additional 1.3 acres of state jurisdictional coastal wetlands would be permanently impacted by placement of right turn acceleration and deceleration lanes and the installation of shoulder backing. These areas consist of narrow strips of wetlands adjacent to the paved roadway over about 20 miles on both shoulders and along the edges of the median. These wetlands have relatively low functions and values (Table 3-29) because of their proximity to the road, their isolation from other wetlands and routine mowing of the area. These wetlands were previously degraded when converted from bay tidal influenced to a freshwater system. These factors, in addition to their long, narrow shape, limit their use as habitat for wildlife.

Alternative 1A Impacts

Alternative 1A includes turnarounds. The turnarounds would impact primarily Palustrine Emergent Wetlands vegetated by grasses and other herbaceous vegetation. Approximately 5.7 acres of federal USACE jurisdictional wetlands and an additional 1.7 acres of state jurisdictional coastal wetlands would be affected. These wetlands have low functions and values for wildlife. However, the grassy shoulder on the east functions as a buffer for highway stormwater runoff. This area would be reduced considerably between the turnarounds and the 101 Slough channel. A 300-foot-long retaining wall would be required between northbound Route 101 and the 101 Slough near Mid-City Motor World that would require driving of concrete H-piles.

Alternative 2 Impacts

Alternative 2 would permanently affect approximately 10.4 acres of federal USACE jurisdictional and 2.1 acres of state jurisdictional coastal Palustrine Emergent Wetlands. The additional wetland impact of Alternative 2 compared to Alternative 1 would be a result of construction of a grade separation at Indianola Cutoff. Wetlands that would be impacted at the Indianola grade separation are vegetated primarily by grasses and other herbaceous vegetation. Like the other Palustrine Emergent Wetlands in the BSA, this area has relatively low function and value (Table 3-29) because of its proximity to the road, its isolation from other wetlands, its previous conversion from tidal to a freshwater system, and routine mowing of the area.

Alternative 3 Impacts

Alternative 3 would permanently impact approximately 7.6 acres of federal USACE jurisdictional wetlands and an additional 2.2 acres of state jurisdictional coastal wetlands by the realignment of Airport Road and the placement of a new Airport Road bridge across the 101 Slough. This area is also primarily Palustrine Emergent Wetlands vegetated by grasses and other herbaceous vegetation. The area is close to Murray Field Airport and commercial development on Jacobs Avenue. Because of its proximity to Route 101, its isolation from other wetlands, routine mowing of the area, and its previous conversion from tidal to a freshwater system, this wetland area has low function and value.

Modified Alternative 3A Impacts

Impacts of this alternative are the same as Alternative 3, except a third northbound lane would be added toward the median extending from 400 feet south of the Airport Road Intersection to Mid-City Motor World, for a total 3-lane segment length of 3,000 feet. This three-lane section is required to ensure vehicles have adequate distance to merge to two lanes and allow an auxiliary right-turn-only lane at Mid-City Motor World. Modified Alternative 3A would permanently impact approximately 8.2 acres of federal USACE jurisdictional and 2.0 acres of state jurisdictional coastal Palustrine Emergent Wetlands vegetated by grasses and other herbaceous vegetation. Approximately 0.01 acre of Estuarine Subtidal waters and 0.1 acre of Estuarine Intertidal wetland that are USACE jurisdictional would be permanently impacted (Coastal Commission jurisdictional the same). Approximately 0.1 acre of Estuarine Subtidal Waters and 0.1 acre of Estuarine Intertidal wetland that are USACE jurisdictional would be permanently impacted (Coastal Commission jurisdictional the same).

For Modified Alternative 3A, there would be temporary impacts to approximately 4.4 acres of federal jurisdictional wetlands and 0.1 acre state jurisdictional wetlands. The temporarily impacted wetlands consist primarily of Palustrine Emergent Wetlands, but also include approximately 0.1 acre of Estuarine Intertidal wetland that are federal jurisdictional.

Figure 3-26A Wetland Photograph
Photograph facing north, adjacent to Route 101 and the Route 101 Slough showing approximate location of proposed crossing of Airport Road for Alternative 3. Intertidal and Palustrine wetlands would be impacted at this location.

Figure 3-26B Wetland Photograph
Photograph facing northeast showing location of proposed replacement of the Route 101 southbound Jacoby Creek bridge. Subtidal, Intertidal, and Palustrine wetlands would be impacted at this location for all Build Alternatives.

Figure 3-26C Wetland Photograph
Photograph facing south at location of proposed Route 101/Indianola Cutoff interchange for Alternatives 2 and 3. Palustrine wetlands would be impacted between roadway shoulder and railroad track.

Figure 3-26D Wetland Photograph
Photograph of Route 101 median facing south at location of proposed Route 101/Indianola Cutoff interchange. Palustrine wetlands would be impacted within the existing roadway median.

Figure 3-26E Wetland Photograph

Photograph facing north at location of proposed deceleration lane from Route 101 to California Redwood Company Mill. Intertidal and Palustrine wetlands between the existing railroad track and highway would be impacted.

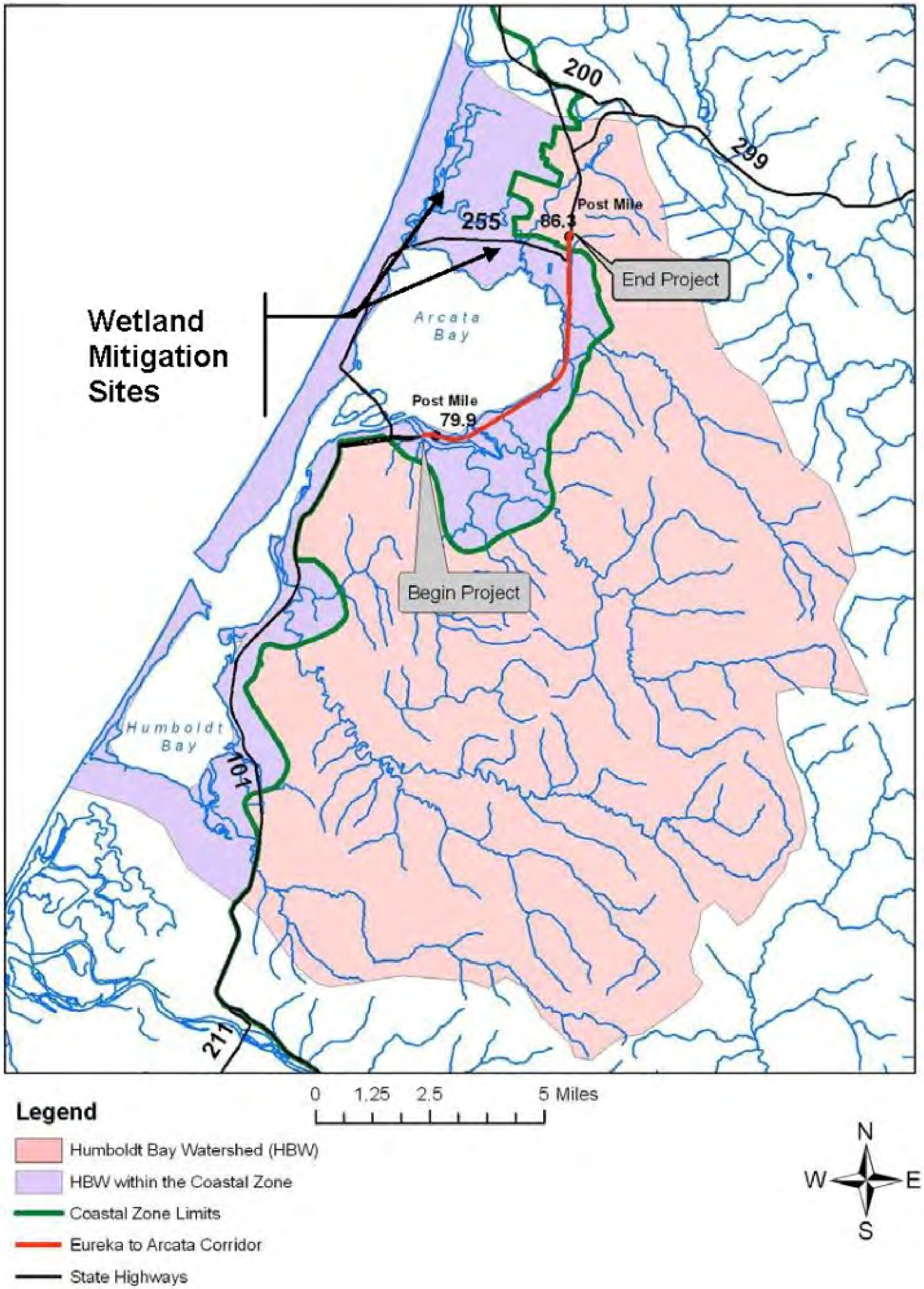

Figure 3-27 Humboldt Bay Coastal Zone Map

NEPA/404 Integration Process and LEDPA Selection

After the Build Alternatives were modified, a Section 404(b)(1) Alternatives Analysis was subsequently prepared because selection of any of the proposed Build Alternatives would require a U.S. Army Corps of Engineers (USACE) Section 404 Individual Permit for permanent wetland impacts. The 404(b)(1) document included an analysis of impacts to aquatic resources and associated sensitive species for each alternative in compliance with the Clean Water Act Section 404(b)(1) Guidelines. In addition, the analysis documented the rationale of selecting the least environmentally damaging practicable alternative (LEDPA) based on specific evaluation criteria developed for the project while meeting the need and purpose for the project. The selection process involved a discussion of impacts of each alternative and why the other alternatives did not qualify. When evaluating harm to non-aquatic resources (i.e., Environmental Justice communities) versus jurisdictional aquatic resources, the alternatives selection process evaluated reasonable and prudent alternatives based on the "net harm" (after mitigation) of the alternative to Environmental Justice communities. Refer to the Potential Environmental Impacts Table (Table S-1) in the Summary of this document for a comparison of impacts by alternative.

In this analysis, Caltrans and FHWA, in consultation with state and federal resource agencies, identified Alternative 3A as the LEDPA and the Preferred Alternative in terms of balancing benefits and impacts to the overall environment while meeting the project need and purpose. While Alternative 3A would impact 6.5 more wetland acres than Alternative 1, Alternative 3A would have the least damage to the overall environment in terms of avoiding adverse environmental consequences to human use characteristics and other environmental resources.

This analysis of the proposed alternatives presents information that eliminates Alternatives 1, 1A, 2, 3, and the No-Build Alternative as the LEDPA. Alternative 1 was rejected for its substantial impacts to Environmental Justice communities and substantial adverse effects resulting from out-of-direction travel. Feasible mitigation, such as constructing a new frontage road, was not available to reduce or compensate for impacts to Environmental Justice communities or the local businesses in the project area. Alternative 1A would result in substantial adverse effects to non-motorized traffic as well as potentially creating driver confusion. Alternatives 2 and 3 were rejected because of direct impacts to aquatic resources.

At the request of the Humboldt County Association of Governments (HCAOG) and Jacobs Avenue residents and businesses, Caltrans began to consider modifications to Alternative 3A to improve Route 101 access from Jacobs Avenue and Airport Road. In June 2010, Caltrans modified the turn movements allowed at the Airport Road signal in the original Alternative 3A to allow southbound turn movements from Airport Road—referred to as a half signal. For purposes of clarity, the original Alternative 3A was dropped and the modified alternative is now referred to as Modified Alternative 3A.

The 404(b)(1) Alternatives Analysis became the basis for selecting the LEDPA as part of the NEPA/404 Integration process. Modified Alternative 3A is currently the proposed LEDPA and Preferred Alternative that meets the project need and purpose of safety improvement (and other long-term highway improvements) and would benefit all travel modes while minimizing traffic access, visual, and wetland impacts.

Prior to release of the Final EIR/S, USACE, USEPA and USFWS were asked to provide preliminary agreement on conceptual mitigation for unavoidable impacts to special aquatic sites. USACE and USEPA were also asked to provide preliminary agreement on the LEDPA pursuant to the Clean Water Act. Under the NEPA–404 Guidance Papers (1994:13), the practicable alternative that is the least environmentally damaging to aquatic resources must be selected *unless* this alternative would have *other significant environmental consequences;* for example, impact on Environmental Justice communities.

Subsequent actions under the NEPA/404 Integration MOU consist of NEPA/404 agency concurrence on the Conceptual Wetland Mitigation Plan (CMP) and LEDPA; the publication of the Final EIR/S by Caltrans and FHWA; and issuance of the Section 404 Individual Permit by the USACE. **Status:** USFWS, USEPA, and USACE have formally concurred with the LEDPA and the CMP. NOAA Fisheries did not submit formal comments regarding the LEDPA and the CMP.

AVOIDANCE, MINIMIZATION, AND/OR MITIGATION MEASURES

Summary of Wetland Impact Avoidance Efforts

During initial project planning, four Eureka-Arcata Corridor improvement project alternatives were recommended for programming in a Project Study Report. Two alternatives included constructing new frontage roads, which would have incurred substantial wetland impacts. A subsequent Supplemental Project Study Report was approved which recommended reducing the range of alternatives to be studied because of extensive environmental impacts and anticipated lack of support for high construction and mitigation costs. Alternatives that included frontage roads were dropped from further consideration primarily because of substantial added wetland and wildlife refuge impacts on both sides of Route 101, as well as the Eureka Slough. Wetland mitigation would not be feasible for wetland impacts resulting from frontage road construction. (For more information regarding the project alternative development process, see Chapter 2.)

After the PSR and Supplemental PSR were approved, Caltrans completed a Value Analysis Study Report in February 2002. The Value Analysis process included an analysis of alternatives proposed during the project initiation phase, developed possible viable alternatives, built consensus and resolved issues with project stakeholders and transportation partners, examined reducing costs as well as reducing life cycle costs, and validated the project need and purpose. The team then chose the best alternatives from the 75 initial ideas and further developed and analyzed those. Many of the alternatives (including those involving frontage roads, new slough crossings, and wider shoulders) were dropped from further consideration because they did not meet the need and purpose or did not meet Selection Criteria, which included wetland impacts.

The Value Analysis (VA) process produced two recommended alternatives, and one alternative that included three different grade separation design options. Eventually the compact diamond grade separation was chosen and the other two design options were dropped from further consideration. The compact diamond grade separation would have the least wetland impact compared to the other grade separation designs. In addition, the VA team concluded that dropping shoulder widening from the alternatives would be feasible because it would further minimize wetland impacts.

The two alternatives would eventually be combined with proposed roadway rehabilitation improvements and a signal alternative. To further avoid wetland impacts, a roadway design exception was acquired to maintain existing curves north of the Eureka Slough bridge. For Alternative 3, which includes signalization at Airport Road, adverse effects to the watercourse parallel to Route 101 would be minimized by incorporation of a retaining wall and completely spanning the slough for the realigned Airport Road intersection. For the proposed deceleration lane improvement at Cole Avenue, by widening and realigning to the roadway median, effects to the same watercourse would be minimized for all Build Alternatives. The existing access to northbound Route 101 would be eliminated for Alternatives 1, 1A, 2, and Modified Alternative 3A. Finally, the overall project was shortened, which included dropping a proposal to realign the freeway at the north end of the project.

After meeting with the U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, NOAA Fisheries, California Department of Fish and Wildlife, and the California Coastal Commission, Modified Alternative 3A was selected as the Least Environmental Damaging Practicable Alternative (LEDPA) and identified as the Preferred Alternative. (See Appendix E – NEPA/404 Integration for a discussion of the LEDPA process, and Chapter 2 for a discussion of identifying the Preferred Alternative.)

Several measures were taken to avoid and minimize impacts of the LEDPA to Waters of the U.S. through design and construction methods. These are listed below:

- Modified Alternative 3A includes a redesigned grade separation with steepened slopes and narrower median to minimize wetland impact compared to the grade separation designs with Alternatives 2 and 3.

- Modified Alternative 3A includes a half signal at the Airport Road intersection, which further reduces wetland impact compared to the full signalized intersection as part of Alternative 3.

- Outside shoulder widths for the proposed acceleration and deceleration lanes were reduced from 10 feet to 4 feet at certain locations to further minimize wetland impact.
- Widening the outside shoulder was initially proposed on the Route 101 expressway segment; this proposal was dropped from the project to further reduce wetland impact.
- Construction staging was revised to avoid the construction of a temporary traffic detour route during the construction of Jacoby Creek bridge.

It should be noted that the initial Route 101 southbound Jacoby Creek bridge replacement strategy included a bridge with piers in the channel. In order to reduce impacts to Waters of the U.S. and wetlands, the current strategy now consists of replacing the existing southbound Jacoby Creek bridge with a single span structure.

In addition, the initial proposed project included widening both the northbound Jacoby Creek bridge and the northbound Gannon Slough bridge by adding a row of piers in the channels. Bridge widening at both locations has been dropped from all Build Alternatives, thereby avoiding impacts to wetlands and Waters of the U.S. at these two locations.

Conceptual Wetland Mitigation Plan

Because project construction would result in unavoidable impacts to jurisdictional wetlands, wetland mitigation would be required. At the project site, the existing highway right-of-way is limited to a narrow strip and is primarily comprised of jurisdictional wetlands; therefore, development of off-site wetland mitigation would be necessary. In an effort to identify potential mitigation properties for the proposed project within the greater project vicinity, as well as to collaborate and build upon local and regional wetland restoration planning activities, Caltrans has had many discussions with various state and local agencies, land trusts, restoration professionals, and private landowners. This section includes summary information from the Eureka to Arcata Corridor Improvement Project Conceptual Mitigation Plan, 2011 (Appendix J). In consultation with the USEPA, USACE, USFWS, CCC and the CDFW, the conceptual mitigation plan has been further refined as the Humboldt Bay Area Mitigation Concept Design Report, 2016 (Appendix N), which is a scoping/planning document and still subject to revision pursuant to coordination with the responsible resource agencies.

The Mitigation Rule (33 Code of Federal Regulation [CFR] Parts 325 and 332, and 40 CFR Part 230) supersedes Regulatory Guidance Letter 02-02 Guidance on Compensatory Mitigation, as well as parts of the 1990 *Memorandum of Agreement between Caltrans, the Department of the Army and the Environmental Protection Agency on the Determination of Mitigation Under the Clean Water Act 404(b)(1) Guidelines* relating to the amount, type, and location of compensatory mitigation, and the use of preservation (33 CFR 332.1 [f] and 40 CFR 230.91 [e]). The California Coastal Act also requires compensatory mitigation for project actions that result in unavoidable impacts to wetlands; however, formal state regulation regarding what constitutes appropriate compensatory mitigation has not been issued. Compensatory mitigation must be sufficient to replace lost aquatic resource functions; in cases where appropriate functional or conditional assessment methods or other suitable metrics are available, these methods should be used to determine how much mitigation is required (33 CFR 332.3 [f][1] and 40 CFR 230.93 [f][1]).

For the Eureka to Arcata Corridor Improvement Project, affected wetland area consists of narrow strips of previously degraded wetland directly adjacent to the Route 101 roadway (pavement), within the highway shoulder and the edges of highway median, over a distance of several miles. Affected wetlands exhibit a limited functional capacity due to their previous conversion from tidal wetland to freshwater wetland, their proximity to roadway, routine mowing of the area, their physical shape (narrow, linear bodies), and existing infrastructure that serves to physically isolate them from other wetlands. Affected wetlands are in poor condition; they fail to support a community of organisms with a species composition, diversity and functional organization comparable to reference wetlands in the area.

Federal mitigation regulation, the Mitigation Rule, has established a hierarchical preference for compensatory mitigation (to be approached by applicant in ***descending*** order):

1. Mitigation bank credits
2. In-lieu fee program credits
3. Permittee-responsible mitigation under a watershed approach
4. Permittee-responsible through on-site and in-kind mitigation
5. Permittee-responsible through off-site and/or out-of-kind mitigation

No mitigation banks or In-lieu fee programs offer mitigation credits for the Humboldt Bay subbasin, or larger Mad-Redwood Watershed. Therefore, Caltrans has made use of a watershed-informed approach to provide compensatory mitigation. The proposed wetland mitigation strategy for the Eureka to Arcata Corridor Improvement Project consists of restoring and enhancing wetlands outside the project limits, but adjacent to large publically-held natural resource properties that are within the Humboldt Bay watershed and the Coastal Zone limits.

Per the Mitigation Rule, 33 CFR Subsection 332.3(c)

"The goal of a **watershed approach** is to maintain and improve the quality and quantity of aquatic resources within watersheds—through strategic selection of compensatory mitigation sites," and "where no watershed plan is available, the watershed approach should be based upon information provided by project sponsor". Because no watershed plan addressing the overall current wetland status exists for the Humboldt Bay area, Caltrans performed extensive research into the area's historical wetland ecology.

The HBAM watershed approach also considers current conditions under a human-built environment and possible future conditions under climate change.

Today, the Humboldt Bay coastal plain is nearly all in agriculturally-managed wetlands under the jurisdiction of the USACE and/or the CCC. In performing research, Caltrans investigated the former ecology of today's agriculturally-managed wetlands above the elevation of the former tidelands. Soil surveys, performed by the United States Department of Agriculture in 1925, characterize the coastal plain soils located above the historic extent of tidal inundation as retaining moisture well, and as being historically covered by forest, willows, elder (sic), fir and spruce, with small inclusion of open grass and sedge dominated areas—all of which had been large cleared and cultivated as of 1925 (Caltrans 2016).

Caltrans estimates that echoing the 90 percent conversion of the area's Estuarine Intertidal Emergent wetlands (tidal marsh) into agriculturally-managed Palustrine Emergent wetland, approximately 90 percent of the area's once-historic Palustrine Forested and Palustrine Scrub/shrub wetlands have been similarly converted to agriculturally-managed emergent wetland.

Elsewhere in the State, agricultural development was able to successfully drain existing wetlands; however, due to the area's cool maritime climate, agricultural development was unsuccessful in fully draining the wetlands of Humboldt Bay—instead converting them to Palustrine Emergent wetland (PEM) (Figure 3-28). Within the Humboldt Bay area, a negligible amount of actual wetland acreage has actually been lost to fill or draining. Instead, the ecological effects of land use (primarily agriculture development) has resulted in substantial degradation to wetland function and service on approximately 90 percent of the historic wetlands (both Estuarine Intertidal Emergency and Palustrine Forested/Palustrine Scrub-shrub wetland) (Caltrans 2016).

Because so little actual wetland acreage has actually been lost, through use of a watershed approach, Caltrans has identified that for the Humboldt Bay area (and the Mad-Redwood watershed) rather than the creation of wetland acreage, the ecological need is for *restoration of wetland functions* lost to agricultural development; specifically, resource functions associated with Estuarine Intertidal Emergent and Palustrine Forested/Palustrine Scrub-shrub wetlands, thereby providing wetland functions whose scarcity within the watershed cannot be overstated. Utilizing agriculturally-managed wetland at the Samoa and Lanphere parcels, the Humboldt Bay Area Mitigation (HBAM) would restore wetland functions that have been largely lost to the landscape and watershed. (See HBAM Concept Design Report for additional watershed information).

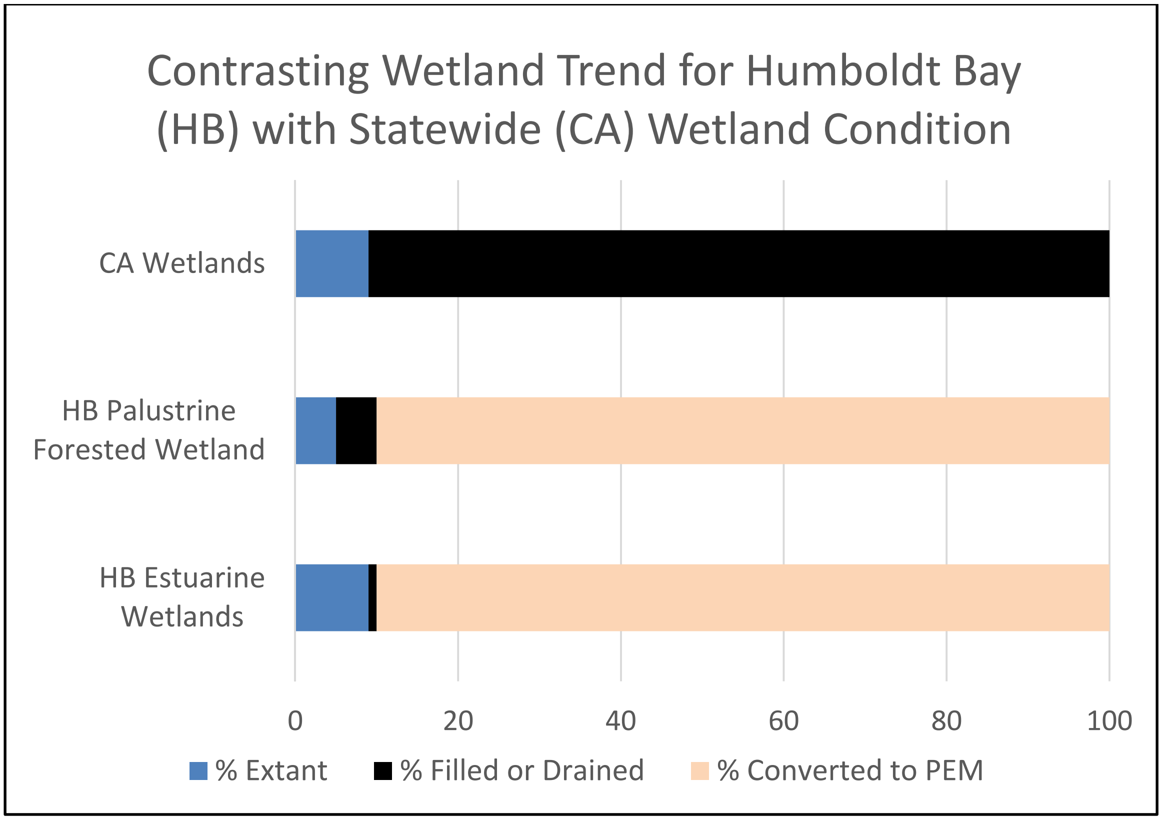

Figure 3-28: Contrasting Wetland Trend for Humboldt Bay and Statewide Wetland Condition

This report utilizes wetland mitigation terminology as defined under the Mitigation Rule. Wetland restoration comprises two terms: re-establishment and rehabilitation. Re-establishment is a manipulation of the physical, chemical or biological characteristics of a site with the goal of *returning* natural/historic functions to a *former* aquatic resource. Rehabilitation is a manipulation of the physical, chemical or biological characteristics of a site with the goal of *repairing* natural/historic functions to a *degraded* aquatic resource. Wetland enhancement means the manipulation of the physical, chemical, or biological characteristics of an aquatic resource to *heighten, intensify, or improve* a specific aquatic resource function(s). (33 Code of Federal Regulations 332.2 and 40 CFR 230.92)

With the HBAM Concept Design Report, Caltrans has proposed a large-scale mitigation strategy focused on wetland restoration, providing ample compensatory mitigation and thereby mitigating impacts of the Eureka-Arcata Corridor Project—as well as providing additional opportunity for offsetting impacts to wetlands associated with other upcoming transportation projects within the watershed.

HBAM proposes the use of three parcels, for a total land area encompassing over 150 acres. The parcels are referred to as the Lanphere Parcel and the Old Samoa Parcels.[27] Figure 3-29 Wetland Mitigation Location Map and Figure 3-27 Coastal Zone show the two proposed wetland mitigation sites that are within the same Humboldt Bay watershed and Coastal Zone as the proposed roadway improvement project. The two major elements of the HBAM proposal are to 1) re-establish approximately 30 acres of Estuarine Intertidal habitat at the Lanphere Parcel (on agriculturally-managed Palustrine Emergent wetland),[28] and 2) perform approximately 78 acres of Palustrine Forested, Palustrine Scrub/shrub wetland rehabilitation and enhancement at the Samoa Parcels (on agriculturally-managed Palustrine Emergent wetland).

Caltrans acquired the 78 acre Lanphere parcel specifically for wetland mitigation purposes (Figure 3-29). The Lanphere Parcel is located west of the city of Arcata, at the end of Lanphere Road, and is located between the Mad River Slough and the Pacific Ocean. The agricultural soils are non-prime. For more information regarding agriculture refer to Chapter 3, Section 3.1.3 FarmlandsaAgricultural Lands. The parcel is located directly adjacent to the United States Fish and Wildlife Service (USFWS) Humboldt Bay National Wildlife Refuge's Lanphere and Ma-le'l Dunes Units (a refuge unit encompassing 640 acres).

Caltrans also acquired the Samoa Parcels for wetland mitigation purposes (total acreage of approximately 80 acres). The Samoa parcels are located just west of the city of Arcata, between State Route 255 and Old Samoa Road. This site is directly adjacent to the California Department of Fish and Wildlife (CDFW) Mad River Slough Wildlife Area (protected resource lands encompassing over 550 acres), as well as the City of Arcata's Marsh and Wildlife Sanctuary (a sanctuary encompassing over 300 acres).

Similar in approach to that of a mitigation bank, HBAM avoids the pitfalls of "postage stamp" mitigation by avoiding a piecemeal approach to mitigating wetland loss. HBAM affords an opportunity to restore ecosystem function over large areas, as opposed to small and/or isolated wetland sites. Utilizing strategically located parcels, HBAM proposes the restoration of wetland function in locations that provide additive function to neighboring, publically-managed natural resource properties—adding substantial acreage of suburban wild land.

[27] The 2011 Eureka to Arcata Corridor Improvement Project Conceptual Mitigation Plan made use of just two of these parcels—the Lanphere Parcel (formerly known as Demello South) and the westernmost Samoa parcel.

[28] The HBAM Concept Design Report describes three restoration alternatives at the Lanphere Parcel (full-tidal, muted tidal and non-tidal). However, since publication, the decision was made to implement the full tidal alternative.

Figure 3-29 Wetland Mitigation Location Map

Most of Lanphere Parcel is a former tideland situated behind a levee, adjacent to the Mad River Slough. The 78-acre parcel is dominated by an approximate 38 acre pasture (utilized for cattle grazing) but also includes adjoining deciduous freshwater swamp, riparian habitat, forested upland dunes, a minor amount of herbaceous upland dune habitat, some low-quality brackish marsh, as well as estuarine intertidal and subtidal habitats. The pasture area of the parcel contains approximately 16.3 acres of upland including an approximate 0.8-acre relict dune. (Within the pasture area all but the relict dune would qualify as coastal wetland.) It is desirable at this location to pursue full tidal restoration of approximately 30 acres within the pasture area. It is also desirable to preserve the existing 9+ acres of high-quality riparian habitat (Palustrine Forested wetland), as well as establish an additional 5+ acres of forested wetland within this riparian area.

The 80 acres in the Old Samoa parcels are former tideland located behind a levee. The parcels have long been in agricultural use primarily for hay production and cattle grazing. The parcels exhibit a single canopy layer of herbaceous vegetation and include artificial drainage swales that serve to prematurely hasten water off the property. The Old Samoa parcels are entirely both USACE and coastal jurisdictional wetland. However, because of the parcels' compromised wetland status, wetland function and service are low. As with Demello South, pasture vegetation is dominated by non-native commercial forage species such as tall fescue (*Festuca arundinaceae*), ryegrass (*Lolium perennis*) and clover (*Trifolium repens*). Current hydrologic sources are fresh water (a high water table and rainfall); there is no existing connectivity for saltwater influence. Because of the parcels' low-lying topography, manipulated hydrology, and current vegetation management activities, approximately 24 acres of wetland rehabilitation (which would restore the historic Palustrine Forested/scrub wetland that once existed there) and 54 acres of Palustrine Forested/scrub wetland enhancement (on former tideland) can be achieved at this location. (In 2010, at the north end of the westernmost parcel, two acres of native wetland tree and shrub species were installed [minimum set back 50 feet from SR 255] as wetland mitigation for another project.)

A final Wetland Mitigation Plan will be completed after the FEIR/S is finalized. The final mitigation plan would require mitigation monitoring and performance standards, ensuring that successful mitigation has been established. Performance standards would conform to the USACE's South Pacific Division Uniform Performance Standards, or as otherwise developed in coordination with applicable regulatory agencies.

As appropriate compensatory mitigation, Caltrans proposes to increase wetland functions that are critical for maintaining and improving the ecological function of the Humboldt Bay watershed. Proposed mitigation would provide a suite of functions and services that are currently non-existent to negligible, as well as impracticable to implement, at the impact site. Proposed mitigation is of regional significance and ties into regional conservation plans. Proposed mitigation is compatible with adjacent land use and would enhance the ecologic value of adjacent natural resource properties.

Wetlands Only Practicable Finding

Modified Alternative 3A is the Preferred Alternative identified in this document and, if constructed, would unavoidably permanently impact a combined total of 10.2 acres of USACE and coastal wetlands. As stated previously, Executive Order for the Protection of Wetlands (E.O. 11990) states that a federal agency, such as the Federal Highway Administration, cannot undertake or provide assistance for new construction located in wetlands unless the head of the agency finds: 1) that there is no practicable alternative to the construction and 2) the proposed project includes all practicable measures to minimize harm.

1. There are no practicable alternatives to the proposed project because most of the existing Route 101 roadway and bridges within the project limits are either adjacent to, or within existing wetland. Any improvements to this facility to avoid wetland impact would not meet the project need and purpose.

2. As previously discussed in detail under the Avoidance, Minimization, and/or Mitigation Measures section, all practicable measures to minimize harm to wetlands have been included in the project planning phase and will be incorporated in the project construction phase.

Based on the above considerations, it is determined that there is no practicable alternative to the proposed construction in wetlands and that the proposed project includes all practicable measures to minimize harm to wetlands that may result from such use.

Wetland Mitigation Conclusion

For any of the Build Alternatives, wetland mitigation would be required in accordance with the regulatory agencies having wetland jurisdiction. As described earlier in this wetland section, most of the wetlands potentially impacted by any one of the Build Alternatives largely consist of narrow strips of low quality wetlands adjacent to the paved roadway.

Wetland mitigation would occur at locations that would not be long and narrow; therefore, it would offer the potential for much better wetland value and function. Even though the permanent wetland impact could potentially be as high as 12.5 acres for Alternative 2, the higher value mitigation described above can be accomplished for this and the other Build Alternatives to yield a net increase in wetland function and value. A final Wetland Mitigation Plan will be completed after the FEIR/S is finalized. However, any final mitigation plan would ultimately require mitigation monitoring and performance standards, thereby ensuring that successful mitigation has been established. Performance standards would conform to the USACE's South Pacific Division Uniform Performance Standards or as otherwise developed in coordination with applicable regulatory agencies.

3.3.3 Special Status Plant Species

REGULATORY SETTING

The U.S. Fish and Wildlife Service (USFWS) and California Department of Fish and Wildlife (CDFW) share regulatory responsibility for the protection of special status plant species. Special status species are selected for protection because they are rare and/or subject to population and habitat declines. Special status is a general term for species that are afforded varying levels of regulatory protection. The highest level of protection is given to Threatened and Endangered Species. These are species that are formally listed or proposed for listing as Endangered or Threatened under the Federal Endangered Species Act (FESA) and/or the California Endangered Species Act (CESA). (See Chapter 3, Section 3.3.5—Threatened and Endangered Species for detailed information regarding these species.)

This section discusses all other special status plant species, including CDFW fully protected species and species of special concern, USFWS candidate species, and other non-state or federally listed species tracked by the California Natural Diversity Database and California Native Plant Society regardless of their legal or protection status.

The regulatory requirements for Federal Endangered Species Act can be found at 16 United States Code (USC), Section 1531, et. seq. and 50 Code of Federal Regulations (CFR) Part 402. The regulatory requirements for CESA can be found at California Fish and Game Code Section 2050, et. seq. Caltrans projects are also subject to the Native Plant Protection Act, found at Fish and Game Code Section 1900-1913, and the California Environmental Quality Act, Public Resources Code Sections 2100-21177.

AFFECTED ENVIRONMENT

Existing records of special status plant species occurrences were consulted prior to conducting field surveys to determine which species have the potential to occur in the Biological Study Area (BSA). The following sources were consulted:

- U.S. Fish and Wildlife Service (USFWS) species list for Fields Landing, McWhinney Creek, Arcata South, Arcata North, Eureka, Tyee City, Blue Lake, Korbel, Iaqua Buttes and Cannibal Island USGS 7.5 minute quadrangles dated June 14, 2006 and updated for Humboldt County in 2014. This list is located in Appendix H.

- USFWS Information for Planning and Conservation (IPaC) Trust Resource Report for the Eureka Arcata Corridor Route 101 (Generated May 5, 2016 03:26 PM MDT, IPAC v3.0.2) (USFWS 2016) (Appendix H).

- California Natural Diversity Data Base (CNDDB) (California Department of Fish and Wildlife [CDFW] 2003, 2006, 2014, and 2016) occurrence records from the Fields Landing, McWhinney Creek, Arcata South, Arcata North, Eureka, Tyee City, Blue Lake, Korbel, Iaqua Buttes and Cannibal Island USGS 7.5 minute quadrangles.

- California Native Plant Society (CNPS) Electronic Inventory (CNPS 2003, 2006, 2014 and 2016) occurrence records from the Fields Landing, McWhinney Creek, Arcata South, Arcata North, Eureka, Tyee City, Blue Lake, Korbel, Iaqua Buttes and Cannibal Island USGS 7.5 minute quadrangles.

Based on the above sources, it was determined that suitable habitat for fifteen special status plant species is present within the BSA, thus requiring field surveys. Focused rare plant surveys were conducted within the BSA to catalog all plant species and determine if any special status plants would be affected by the proposed project. The BSA includes the shoulder of the south and northbound lanes of the Route 101 right-of-way and the medians. The surveys were timed to coincide with the blooming periods for all of the rare plants that have the potential to occur in the BSA. The surveys were conducted according to CDFW protocol and, in addition to surveying for special status plants, an inventory of the species present at the site was recorded.

Table 3-30 Other Special Status Plant Species Potentially Occurring in the Vicinity of the Biological Study Area (Based on Records Review)

Scientific Name	**Common Name**	**Status**			**General Habitat Description/ Flowering Period**	**Habitat and/or Species Present/ Absent[d]**	**Rationale**
		Federal[a]	**State[b]**	**Rank[c]**			
State and Federally Listed							
Erysimum menziesii	Menzies' wallflower	E	E	1B.1	Coastal dunes; Mar-Apr	A	No habitat present
Layia carnosa	beach layia	E	E	1B.1	Coastal dunes, coastal scrub, mostly in sandy areas; Mar-Jul	A	No habitat present
Lilium occidentale	western lily	E	E	1B.1	Bogs and fens, coastal bluff scrub, coastal prairie, coastal scrub, freshwater marshes and swamps, North Coast coniferous forest; June-July	HP	Potentially: suitable habitat present, but surveys found none present within BSA
Noccaea fendleri ssp. *californica*	Kneeland prairie pennycress	E	None	1B.1	Broadleaf upland forest, coastal prairie (serpentinite); May-June	A	No habitat present

Table 3-30 Other Special Status Plant Species Potentially Occurring in the Vicinity of the Biological Study Area (Based on Records Review)

Scientific Name	**Common Name**	**Status**			**General Habitat Description/ Flowering Period**	**Habitat and/or Species Present/ Absent[d]**	**Rationale**
		Federal[a]	**State[b]**	**Rank[c]**			
California Rare Plant Rank Special Plants							
Abronia umbellata var. *breviflora*	pink sand-verbena	None	None	1B.1	Coastal dunes; Jun-Oct	A	No habitat present
Angelica lucida	seacoast angelica	None	None	4.2	Coastal bluff scrub, coastal dunes, coastal scrub, marshes and swamps; May-Sep	P	Present at Gannon Slough, and north of Mid-City Motor World between roadway and 101 Slough
Astragalus pycnostachyus var. *pycnostachyus*	coastal marsh milk-vetch	None	None	1B.2	Coastal dunes, coastal scrub, marshes, swamps (coastal salt, stream sides); Apr-Oct	HP A	Potential to occur in BSA; surveys found none present
Astragalus umbraticus	Bald Mountain milk-vetch	None	None	2B.3	Cismontane woodland, lower montane coniferous forest; May-Aug	A	No habitat present
Bryoria pseudocapillaris	false gray horsehair lichen	None	None	3.2	North Coast coniferous forest (immediate coast) / usually on conifers	A	No habitat present
Bryoria spiralifera	twisted horsehair lichen	None	None	1B.1	North Coast coniferous forest (immediate coast) / usually on conifers	A	No habitat present

Table 3-30 Other Special Status Plant Species Potentially Occurring in the Vicinity of the Biological Study Area (Based on Records Review)

Scientific Name	**Common Name**	**Status**			**General Habitat Description/ Flowering Period**	**Habitat and/or Species Present/ Absent[d]**	**Rationale**
		Federal[a]	**State[b]**	**Rank[c]**			
Cardamine angulata	seaside bittercress	None	None	2B.1	Lower montane coniferous forest, North Coast coniferous forest; wet areas, stream banks; (Jan) Mar-Jul	A	Not known to occur in BSA; surveys found none present
Carex arctata	northern clustered sedge	None	None	2B.2	Bogs and fens, North Coast coniferous forest (mesic); Jun-Aug	A	No habitat present
Carex leptalea	flaccid sedge	None	None	2B.2	Bogs and fens, meadows and seeps, marshes and swamps; May-Jul	HP A	Marginally suitable habitat within BSA; however, surveys found none present
Carex lyngbyei	Lyngbye's sedge	None	None	2B.2	Marshes and swamps (brackish or freshwater); May-Aug	P	Present at Jacoby Creek
Carex praticola	meadow sedge	None	None	2B.2	Meadows and seeps, typically in mesic areas; May-Jul	HP A	Suitable habitat in BSA; however, surveys found none present
Castilleja ambigua var. *humboldtiensis*	Humboldt Bay owl's-clover	None	None	1B.2	Marshes and swamps (coastal salt); Apr-Aug	P	Suitable habitat in BSA; known to occur at Gannon Slough and Eureka Slough within and adjacent to BSA

Table 3-30 Other Special Status Plant Species Potentially Occurring in the Vicinity of the Biological Study Area (Based on Records Review)

Scientific Name	Common Name	Status			General Habitat Description/ Flowering Period	Habitat and/or Species Present/ Absent[d]	Rationale
		Federal[a]	State[b]	Rank[c]			
Castilleja litoralis	Oregon coast paintbrush	None	None	2B.2	Coastal bluff scrub, coastal dunes, coastal scrub; June	A	No habitat present
Chloropyron maritimum ssp. *palustre*	Point Reyes bird's beak	None	None	1B.2	Marshes and swamps (coastal salt); Jun-Oct	HP A	Occurs in salt marsh habitats near but outside of the BSA; potential to occur in BSA; however, surveys found none present
Coptis laciniata	Oregon goldthread	None	None	4.2	Meadows and seeps, North Coast coniferous forest (stream banks); mesic; Mar-May	A	No habitat present
Didymodon norrisii	Norris' beard moss	None	None	2B.2	Cismontane woodland, lower montane coniferous forest, intermittently mesic, rock	A	No habitat present
Epilobium oreganum	Oregon fireweed	None	None	1B.2	Bogs and fens, lower montane coniferous forest, upper montane coniferous forest, typically in mesic areas; Jun-Sep	A	No habitat present

Table 3-30 Other Special Status Plant Species Potentially Occurring in the Vicinity of the Biological Study Area (Based on Records Review)

Scientific Name	**Common Name**	**Status**			**General Habitat Description/ Flowering Period**	**Habitat and/or Species Present/ Absent[d]**	**Rationale**
		Federal[a]	**State[b]**	**Rank[c]**			
Erythronium oreganum	giant fawn lily	None	None	2B.2	Cismontane woodland, meadows and seeps/sometimes serpentinite, rocky, openings; Mar-Jun (Jul)	A	No habitat present
Erythronium revolutum	coast fawn lily	None	None	2B.2	Bogs and fens, Broad-leafed upland forest, North Coast coniferous forest/mesic, stream banks; Mar-Jul	A	No habitat present
Fissidens pauperculus	minute pocket moss	None	None	1B.2	North Coast coniferous forest (damp coastal soil)	A	No habitat present
Gilia capitata ssp. *pacifica*	Pacific gilia	None	None	1B.2	Coastal bluff scrub, Chaparral (openings), Coastal prairie, Valley and foothill grassland; Apr-Aug	A	No habitat present
Gilia millefoliata	dark-eyed gilia	None	None	1B.2	Coastal dunes; Apr-Jul	A	No habitat present
Hesperevax sparsiflora var. *brevifolia*	short-leaved evax	None	None	1B.2	Coastal bluff scrub, coastal dunes, Coastal prairie; Mar-Jun	A	No habitat present
Lathyrus japonicus	sand pea	None	None	2B.1	Coastal dunes; May-Aug	A	No habitat present

Table 3-30 Other Special Status Plant Species Potentially Occurring in the Vicinity of the Biological Study Area (Based on Records Review)

Scientific Name	Common Name	Status			General Habitat Description/ Flowering Period	Habitat and/or Species Present/ Absent[d]	Rationale
		Federal[a]	State[b]	Rank[c]			
Lathyrus palustris	marsh pea	None	None	2B.2	Bogs and fens, Coastal prairie, coastal scrub, lower montane coniferous forest, marshes and swamps, North Coast coniferous forest / mesic; Mar-Aug	HP A	Potential to occur in BSA; however, surveys found none present
Lycopodium clavatum	running-pine	None	None	4.1	Marshes and swamps, North Coast coniferous forest (mesic), lower montane coniferous forest (mesic); Jun-Sep	A	No habitat present
Mitellastra caulescens	leafy-stemmed miterwort	None	None	4.2	Broad-leafed upland forest, lower montane coniferous forest, meadows and seeps, North Coast coniferous forest / mesic; Mar-Oct	A	No habitat present
Monotropa uniflora	ghost pipe	None	None	2B.2	Broad-leafed upland forest, North Coast coniferous forest; Jun-Aug	A	No habitat present

Table 3-30 Other Special Status Plant Species Potentially Occurring in the Vicinity of the Biological Study Area (Based on Records Review)

Scientific Name	**Common Name**	**Status**			**General Habitat Description/ Flowering Period**	**Habitat and/or Species Present/ Absent[d]**	**Rationale**
		Federal[a]	**State[b]**	**Rank[c]**			
Montia howellii	Howell's montia	None	None	2B.2	Meadows and seeps, North Coast coniferous forest, vernal pools/ vernally mesic, sometimes roadsides; Mar-May	A	No habitat present
Oenothera wolfii	Wolf's evening-primrose	None	None	1B.1	Coastal bluff scrub, coastal dunes, coastal prairie, lower montane coniferous forest/sandy, usually mesic; May-Oct	A	No habitat present
Packera bolanderi var. *bolanderi*	seacoast ragwort	None	None	2B.2	Coastal scrub, North Coast coniferous forest/sometimes roadsides; May-Jul	HP A	Suitable habitat in BSA; however, surveys found none present
Piperia candida	white-flowered rein orchid	None	None	1B.2	Broadleafed upland forest, lower montane coniferous forest, North Coast coniferous forest, sometimes serpentinite; May-Sep	A	No habitat present

Table 3-30 Other Special Status Plant Species Potentially Occurring in the Vicinity of the Biological Study Area (Based on Records Review)

Scientific Name	**Common Name**	**Status**			**General Habitat Description/ Flowering Period**	**Habitat and/or Species Present/ Absent[d]**	**Rationale**
		Federal[a]	**State[b]**	**Rank[c]**			
Puccinellia pumila	dwarf alkali grass	None	None	2B.2	Marshes and swamps (coastal salt), Jul	HP A	Suitable habitat in BSA; however, surveys found none present
Sidalcea malachroides	maple-leaved checker bloom	None	None	4.2	Broadleafed upland forest, coastal prairie, coastal scrub, riparian woodland, North Coast coniferous forest/often in disturbed areas; Mar-Aug	HP A	Potential suitable habitat in BSA; however, surveys found none present
Sidalcea malviflora ssp. *patula*	Siskiyou checkerbloom	None	None	1B.2	Coastal bluff scrub, coastal prairie, North Coast coniferous forest/often roadcuts; May-Aug	HP A	Potential suitable habitat in BSA; however, surveys found none present
Sidalcea oregana ssp. *eximia*	coast checkerbloom	None	None	1B.2	Lower montane coniferous forest, meadows and seeps, North Coast coniferous forest; Jun-Aug	HP A	Potential suitable habitat in BSA; however, surveys found none present
Spergularia canadensis var. *occidentalis*	western sand-spurrey	None	None	2B.1	Marshes and swamps (coastal salt); Jun-Aug	P	Present at Gannon Slough

Table 3-30 Other Special Status Plant Species Potentially Occurring in the Vicinity of the Biological Study Area (Based on Records Review)

Scientific Name	**Common Name**	**Status**			**General Habitat Description/ Flowering Period**	**Habitat and/or Species Present/ Absent[d]**	**Rationale**
		Federal[a]	**State[b]**	**Rank[c]**			
Tiarella trifoliata var. *trifoliata*	trifoliate laceflower	None	None	3.2	Lower montane coniferous forest, North Coast coniferous forest; Jun-Aug	A	No habitat present
Trichodon cylindricus	cylindrical trichodon	None	None	2B.2	Broadleafed upland forest, meadows and seeps, upper montane coniferous forest/ sandy, exposed soil, road banks	A	No habitat present
Viola palustris	marsh violet	None	None	2B.2	Coastal scrub (mesic), bogs and fens (coastal); Mar-Aug	A	No habitat present

[a] **Federal Status Codes:**

E = Endangered. Species in danger of extinction throughout all or a significant portion of its range.
T = Threatened. Species likely to become endangered within the foreseeable future.
PT = Proposed Threatened.
Candidate species that have been found to warrant federal listing as threatened and have been officially proposed as such.
C = Candidate. Species that are undergoing a status review for consideration for federal listing.
D = Delisted. Species that have been removed from federal endangered and threatened species lists.
SC = Species of Concern. Species about which NOAA Fisheries has some concerns regarding status and threats,
but for which insufficient information is available to indicate a need to list the species under the Federal Endangered Species Act.
CH = Critical Habitat present in BSA.

[b] **California Status Codes:**

E = Endangered. Species whose continued existence in California is in jeopardy.
T = Threatened. Species likely to become endangered within the foreseeable future.
C = Candidate for listing. Species that are undergoing a status review for consideration for state listing.
FP = Fully protected and protected species defined in the State of California under Sections 3511 and 4700 of the Fish and Game Code.
SSC = CDFW Species of Special Concern

[c] **California Rare Plant Ranks**

1B.1 = Plants that are rare, threatened, or endangered in California and elsewhere.
Threat rank of 0.1 is considered seriously threatened in California
NA = Not Applicable

[d] **Habitat Determination Codes:**

A = Absent. Not likely to occur within the BSA due to lack of suitable habitat.
P = Species known to be present within BSA
HP = Habitat Present.
Plants: known to have occurred historically in the BSA, but may be extirpated.
Fish: status of population in BSA not presently known.
Other wildlife: potential to occur based on presence of supporting foraging and/or breeding habitat.
Specific occurrence data for the BSA may not have been found.

Survey Results

The following is a list of surveys conducted within the project BSA:

Survey Dates	Surveyed by
May 21 to May 23, 2003	URS (Caltrans consultant)
July 2 to July 4, 2003	URS (Caltrans consultant)
April and June 2006	Gail Popham
October 12 and 27, 2007	Kim Hayler and Gail Popham
June 1, 2011 and June 2, 2011	Valerie Gizinski and Gail Popham
April 15 and 16, 2014	Stephanie Frederickson and Gail Popham
June 23 and 24, 2014	Stephanie Frederickson and Gail Popham

A list of plant species observed in the BSA is presented in Appendix G. No federally or state listed plant species were observed within the BSA, but four special status plants with California Rare Plant Ranks (CRPR) have been identified. These include Humboldt Bay owl's-clover (*Castilleja ambigua* ssp. *humboldtiensis*) (CRPR 1B.2), Lyngbye's sedge (*Carex lyngbyei*) (CRPR 2B,2), western sand-spurrey (*Spergularia canadensis* var. *occidentalis*) (CRPR 2B.1), and seacoast angelica (*Angelica lucida*) (CRPR 4.2). One other special status plant, Point Reye's bird's-beak (*Chloropyron maritimum* ssp. *palustre*) (CRPR 1B.2), was identified near but outside of the BSA in salt marsh habitats associated with the Eureka Slough.

Several hundred Humboldt Bay owl's-clover were documented at the southwest corner of the BSA in the high salt marsh associated with Eureka Slough and along the banks of Gannon Slough east of the Route 101 corridor during surveys conducted in May, July and August. Western sand-spurrey and seacoast angelica were also observed in Gannon Slough east of the corridor during late summer surveys conducted in October. A second population of approximately 25 seacoast angelica was identified in June of 2014 within the managed grassland between the corridor and 101 Slough, approximately 400 feet north of Mid-City Motor World. Lyngbye's sedge was found in the channel of Jacoby Creek. Refer to the Natural Environment Study (2015) for mapping of the occurrences.

ENVIRONMENTAL CONSEQUENCES

The southbound Jacoby Creek bridge replacement work would impact approximately 2,500 square feet of Lyngbye's sedge along Jacoby Creek. With the exception of Lyngbye's sedge, the proposed project would avoid impacts to sensitive plant species.

AVOIDANCE, MINIMIZATION, AND/OR MITIGATION MEASURES

The general measures that would be implemented to avoid and minimize effects to all biological resources, discussed in Section 3.3.1, would be applicable to special status plant species. Specific avoidance and minimization measures would also be developed, as necessary, through coordination with the U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service, National Oceanic Atmospheric Administration (NOAA) Fisheries, U.S. Environmental Protection Agency, California Department of Fish and Wildlife and the California Coastal Commission. This would include, but would not be limited to avoiding vegetation removal whenever possible, and placing exclusionary fencing around sensitive plant populations close to project effect areas to protect them from disturbance.

The project no longer includes impacts to Humboldt Bay owl's-clover, thus no avoidance or minimization measures are necessary.

Coordination with CDFW has determined that impacts to Lyngbye's sedge due to the bridge replacement would not be substantial if appropriate minimization measures were implemented. *(Source: California Department of Fish and Wildlife, 2007)* These minimization measures would include placement of protective 1/2- to 2-inches thick metal/wood/rubber sheets on top of the stands of Lyngbye's sedge where equipment access is required. These pads would be large enough to prevent the equipment tracks/wheels from rutting and compressing the soil and uprooting or destroying the sedges. The disturbed sedge is expected to fully recover within a few seasons.

3.3.4 Animal Species

REGULATORY SETTING

Many state and federal laws regulate impacts to animals. The U.S. Fish and Wildlife Service (USFWS), the NOAA Fisheries and the California Department of Fish and Wildlife (CDFW) are responsible for implementing these laws. This section discusses potential impacts and permit requirements associated with animals not listed or proposed for listing under the state or federal Endangered Species Act. Species listed or proposed for listing as Threatened or Endangered are discussed in Chapter 3, Section 3.3.5–Threatened and Endangered Species. All other special-status animal species are discussed in this section, including CDFW fully protected species and species of special concern, and USFWS or NOAA Fisheries candidate species.

Federal laws and regulations pertaining to animals include the following:

- National Environmental Policy Act
- Migratory Bird Treaty Act
- Fish and Wildlife Coordination Act
- Marine Mammal Protection Act

State laws and regulations pertaining to animals include the following:

California Environmental Quality Act
Sections 1601 – 1603 of the Fish and Game Code
Section 4150 and 4152 of the Fish and Game Code

AFFECTED ENVIRONMENT

Determinations for potential suitable habitat are based on both known reported occurrence locations and historical habitat range information for Humboldt County and USGS quadrangle maps associated with the BSA. The following USGS quads were utilized for the record search: Arcata North, Arcata South, Tyee City, McWhinney Creek, Eureka, Cannibal Island, Iaqua Buttes, Blue Lake and Fields Landing. The following websites and Agencies were queried to develop the lists of species and resources to assess for potential project impacts:

- USFWS Information for Planning and Conservation (IPaC) Trust Resource Report for the Eureka Arcata Corridor Route 101 (Generated May 5, 2016 03:26 PM MDT, IPAC v3.0.2) (USFWS 2016) (Appendix C).
- National Oceanic and Atmospheric Administration National Marine Fisheries Services Arcata Branch list (NOAA Fisheries 2016) (Appendix H).
- California Natural Diversity Data Base (CNDDB 2016) ((Appendix D).
- California Native Plant Society (CNPS) Electronic Inventory (CNPS 2016) (Appendix F).
- Results of Eureka-Arcata Corridor Botanical Surveys Summary (Appendix E).
- Caltrans Environmental Staff.
- Coordination with California Department of Fish and Wildlife (CDFW), NOAA Fisheries and USFWS biologists.
- Aerial photographs and topographic maps were reviewed to establish a baseline evaluation of habitat for listed species. Several visits were made to establish the potential location and quality of habitat for special status species, including threatened and endangered species.

The results of these inquiries are presented in Table 3-31.

Table 3-31 Other Special Status Species Potentially Occurring in the Vicinity of the Biological Study Area (Based on Records Review)

Scientific Name	Common Name	Status			General Habitat Description/ Flowering Period	Habitat and/or Species Present/ Absent[d]	Rationale
		Federal[a]	State[b]	Rank[c]			
Amphibians							
Ascaphus truei	Pacific tailed frog	None	SSC	N/A	Occurs in montane hardwoods-conifer, redwood, Douglas-fir and ponderosa pine habitats	A	No habitat present
Rana aurora	northern red-legged frog	None	SSC	N/A	Humid forest, woodlands, grasslands, and stream sides in northwestern California, usually near dense riparian vegetation	HP P	Common in ditches and channels throughout the BSA
Rana boylii	foothill yellow-legged frog	None	SSC	N/A	Partly shaded shallow streams, and riffles with a rocky substrate in a variety of habitats	A	No habitat present
Reptiles							
Emys (=Clemmys) marmorata	western pond turtle	None	SSC	N/A	Associate with permanent or nearly permanent water in a wide variety of habitats	A	Salinity too high

Table 3-31 Other Special Status Species Potentially Occurring in the Vicinity of the Biological Study Area (Based on Records Review)

Scientific Name	**Common Name**	**Status**			**General Habitat Description/ Flowering Period**	**Habitat and/or Species Present/ Absent[d]**	**Rationale**
		Federal[a]	**State[b]**	**Rank[c]**			
Mammals							
Martes caurina humboldtensis	Humboldt marten	None	SSC	N/A	Occurs only in the coastal redwood zone from the Oregon border south to Sonoma County; associated with late successional coniferous forest, prefers forest with low, overhead cover	A	No habitat present
Myotis evotis	long-eared myotis	None	SSC	N/A	Found in all brush, woodland and forest habitats from sea level to about 9,000 ft. prefers coniferous woodlands and forests; nursery colonies in buildings, crevices, spaces under bark and snags; caves used primarily as night roosts	HP	Foraging habitat present but no maternal roosting habitat (i.e., nursery colonies) within the BSA
Phoca vitulina richardsi	Pacific harbor seal	MMPA	None	N/A	Forage within open ocean, bays, estuaries and saltmarsh channels.	P	Found within Arcata Bay and Gannon Slough

Table 3-31 Other Special Status Species Potentially Occurring in the Vicinity of the Biological Study Area (Based on Records Review)

Scientific Name	**Common Name**	**Status**			**General Habitat Description/ Flowering Period**	**Habitat and/or Species Present/ Absent[d]**	**Rationale**
		Federal[a]	**State[b]**	**Rank[c]**			
Birds							
Accipiter cooperii	Cooper's hawk	None	WL	N/A	Nests in woodlands, chiefly of open, interrupted or marginal type	HP	Suitable habitat in BSA; however, surveys found no nesting
Accipiter striatus	sharp-shinned hawk	None	WL	N/A	Nests in ponderosa pine, black oak, riparian deciduous, mixed conifer and Jeffrey pine habitats, prefers riparian areas	HP	Suitable habitat in BSA; however, surveys found no nesting
Aquila chrysaetos	golden eagle	None	FP WL	N/A	Rolling foothills, mountain areas, sage-juniper flats and desert	A	No habitat present
Ardea alba	great egret	None	None	N/A	**Rookery sites protected.** Colonial nester in large trees located near marshes, tide-flats, irrigated pastures, and margins of rivers and lakes	P	Known to forage in the project area; no rookery sites in the BSA
Ardea herodias	great blue heron	None	None	N/A	**Rookery sites protected.** Colonial nester in tall trees, cliff sides, and sequestered spots on marshes in close proximity to foraging areas: marshes, lake margins, tide-flats, rivers and streams, wet meadows	P	Known to forage in the project area; no rookery sites in the BSA

Table 3-31 Other Special Status Species Potentially Occurring in the Vicinity of the Biological Study Area (Based on Records Review)

Scientific Name	Common Name	Status			General Habitat Description/ Flowering Period	Habitat and/or Species Present/ Absent[d]	Rationale
		Federal[a]	State[b]	Rank[c]			
Egretta thula	snowy egret	None	None	N/A	**Rookery sites protected.** Colonial nester, with nest sites situated in protected beds of dense tules, situated close to foraging areas: marshes, tidal flats, streams, wet meadows, and borders of lakes	P	Known to forage in the project area; no rookery sites in the BSA
Pandion haliaetus	osprey	None	WL	N/A	Nests near ocean shore, bays, fresh-water lakes, and larger streams	P	No nests present in BSA
Phalacrocorax auritus	double-crested cormorant	None	WL	N/A	Rookery sites: usually colonial nester on coastal cliffs, offshore islands, and along lake margins in the interior of the State	A	No habitat present
Invertebrates							
Cicindela hirticollis gravida	sandy beach tiger beetle	None	None	N/A	Clean, dry, light colored sand in upper zone of coastal dunes	A	No habitat present
Fish							
Oncorhynchus clarkii clarkii	coastal cutthroat trout	None	SSC	N/A	Pacific Ocean, spawn in coastal streams and rivers, over gravel beds	HP P	Known to occur in the BSA

[a] Federal Status Codes:

E = Endangered. Species in danger of extinction throughout all or a significant portion of its range.
T = Threatened. Species likely to become endangered within the foreseeable future.
PT = Proposed Threatened. Candidate species that have been found to warrant federal listing as threatened and have been officially proposed as such.
C = Candidate. Species that are undergoing a status review for consideration for federal listing.
D = Delisted. Species that have been removed from federal endangered and threatened species lists.
SC = Species of Concern. Species about which NOAA Fisheries has some concerns regarding status and threats, but for which insufficient information is available to indicate a need to list the species under the federal Endangered Species Act.
CH = Critical Habitat present in BSA.

MMPA = Marine Mammal Protection Act

[b] California Status Codes:

E = Endangered. Species whose continued existence in California is in jeopardy.
T = Threatened. Species likely to become endangered within the foreseeable future.
C = Candidate for listing. Species that are undergoing a status review for consideration for State listing as threatened or endangered.
FP= Fully protected and protected species defined in the State of California under Sections 3511 and 4700 of the Fish and Game Code.
SSC= CDFW Species of Special Concern.
WL= CDFW Watch List species.

[c] California Rare Plant Ranks

1A = Plants presumed extirpated in California and either rare or extinct elsewhere.
1B = Plants that are rare, threatened, or endangered in California and elsewhere.
2A = Plants presumed extirpated in California, but common elsewhere.
2B = Plants rare, threatened, or endangered in California, but more common elsewhere.
3 = Plants about which more information is needed – a review list.
4 = Plants of limited distribution – a watch list.

Threat Ranks:
0.1 = Seriously threatened in California
0.2 = Moderately threatened in California
0.3 = Not very threatened in California
N/A = Not Applicable

[d] Habitat Determination Codes:

A = <u>Absent.</u> Not likely to occur within the BSA due to lack of suitable habitat.
P = <u>Present</u>. Species known to be present within BSA.
HP = <u>Habitat Present.</u>

Plants: known to have occurred historically in or adjacent to the BSA, but may be extirpated.
Fish: status of population in BSA not presently known.
Other wildlife: potential to occur based on presence of supporting foraging and/or breeding habitat. Specific occurrence data for the BSA may not have been found.

The Humboldt Bay area provides habitat for a large diversity of native aquatic and terrestrial animal species. At several locations to the east and west of the BSA, state and national wildlife refuge areas can be found. However, the BSA is dominated by Route 101, thus does not provide diverse and abundant habitat for wildlife. The vegetated median and edges of the highway are considered to be of marginal use for most species due to proximity to the highway. While the potential for most of the following species to occur in the BSA is low, mammalian species present in the project vicinity include black-tailed deer (*Odocoileus hemionus*), gray fox (*Urocyon cinereoargenteus*), raccoon (*Procyon lotor*), opossum (*Didelphis virginiana*), river otter (*Lontra canadensis*), rodents, weasels, skunks, and bats. Bird species include waterfowl (e.g., ruddy duck), wading birds (e.g., herons, egrets, sora rail, black crowned night heron), raptors (e.g., northern harrier), and songbirds (red-winged blackbird, marsh wren, savannah sparrow, barn swallow, cliff swallow). Route 101 is a potential barrier to terrestrial species traveling between the bay and wetland habitats to the east. In the corridor, animal-vehicle collisions are common and primarily involve raccoons, grey foxes, black-tailed deer, opossums and some bird species.

Within the BSA, Jacoby Creek and Gannon Slough serve as migration corridors for fish (such as salmon) that move between salt and fresh water to complete their life history. The sloughs also provide breeding/nesting and foraging habitat for aquatic mammals, waterfowl, and shorebirds. The 101 Slough on the east side of Route 101 within and adjacent to the BSA is known to contain tidewater goby, may serve as a rearing area for salmonids, and provides feeding habitat for migratory waterfowl and shorebirds. The brackish waters of the sloughs and watercourses provide potential habitat for special status species such as coastal cutthroat trout, Southern Oregon/Northern California Coast coho salmon, northern California steelhead, California Coastal Chinook salmon, longfin smelt, green sturgeon, Pacific eulachon and tidewater goby. Other fish that were found from surveys conducted on August 31, 2006 in the 101 Slough and Gannon Slough include three-spine stickleback (*Gasterosteus aculeatus*), bay pipefish (*Syngnathus leptorhynchus*), mosquitofish (*Gambusia affinis*), staghorn sculpin (*Leptocottus armatus*), and prickly sculpin (*Cottus asper*).

Special Status Species

Bats

Bats are classified as non-game mammals by the California Department of Fish and Game. Bats are afforded protection under various Fish and Game Code sections, including Sections 86, 2000, 2014, 3007, and 4150. Several sections under Title 14 of the California Code of Regulations also apply, including but not limited to: Section 251.1, Article 20, Section 15380, Section 15382, and several sections under the California Public Resources Code, Division 13.

The BSA is within the range of the long-eared myotis (*Myotis evotis*) and the Townsend's big-eared bat (*Corynorhinus townsendii*), which is a state listed candidate species. No surveys were conducted for bats. However, both species may forage and roost within the BSA. Both bats have the potential to day roost or night roost on bridges and buildings within the BSA.

There are minimal potential impacts to bat species within the BSA. There are no known maternal roosts. Tree and shrub removal may reduce foraging habitat within the BSA. Vegetation removal would be minimal, however there is habitat adjacent to the removal areas. There is also potential for temporary disturbance and loss of night and day roosting habitat associated with the Jacoby Creek bridge replacement. To reduce direct impacts to bats associated with the bridge replacement, exclusionary devices would be installed to inhibit night or day roosting during construction.

Migratory Birds

The Federal Migratory Bird Treaty Act (MBTA)(15 USC 703-711), Title 50 Code of Federal Regulations (CFR) Part 21 and 50 CFR Part 10, and the CDFG Game Code Sections 3503, 3513, and 3800, protect migratory birds, their occupied nests, and their eggs from disturbance or destruction. Bird nests that are occupied or contain migratory bird eggs are protected from possession, sale, purchase, barter, transport, import, export, and take. The MBTA provides protection in part by restricting the disturbing of nests during bird nesting season.

Focused bird surveys have not been conducted within the BSA; however, barn swallows (*Hirundo rustica*) and cliff swallows (*Petrochelidon pyrrhonota*) may use Jacoby Creek bridges for nesting. Both species often use bridges as nest sites. They build mud nests that attach under bridge decks or to concrete piers. Other species of migratory birds may be nesting in the trees, shrubs and other vegetation throughout the BSA.

Due to their mobility, direct impacts to birds are unlikely. Impacts to active nests would not occur since vegetation removal and exclusionary devices would be installed on the Jacoby Creek bridge outside of the nesting season. The project would result in some temporary impacts from the removal of nesting vegetation.

Coastal Cutthroat Trout

Coastal cutthroat trout (*Oncorhynchus clarkii clarkii*) is a state species of special concern. This species occurs from the Eel River north along the coast to southeastern Alaska. It is anadromous and migration to the ocean peaks in May. Coastal cutthroat trout frequently stay close to shore or in areas of reduced salinity, like river plumes. They return to freshwater streams in the late summer, fall, or winter of the year they go to sea. Cutthroat trout exhibit the most variable range in migratory behavior found in the salmonid complex, perhaps as a result of the great varieties of habitats they can occupy.

They can be found in large river systems, small streams, tributaries, nearshore marine waters, estuaries, sloughs, lagoons, bogs, ponds, and large lakes. This species is present in all of the tributaries to Humboldt Bay. This species occurs in the BSA; and also occurs within the ditches located immediately adjacent to the BSA.

Northern Red Legged Frog

Northern red-legged frog (*Rana aurora*) is a state species of special concern. Red-legged frogs can be found in humid forest, woodlands, grasslands, and streamsides in northwestern California, usually near dense riparian vegetation. These frogs are tolerant of brackish water and are common in ditches and channels throughout the BSA.

Pacific Harbor Seal

The Pacific harbor seal (*Phoca vitulina richardsi*) is afforded protection under the federal Marine Mammal Protection Act. Pacific harbor seals use Humboldt Bay year-round. Harbor seals haul out in groups ranging in size from a few individuals to several hundred seals. Habitats used as haul-out sites include tidal rocks, mudflats, sandbars, and sandy beaches. Haul-out sites are used consistently from year to year and are important habitats for harbor seals. Human disturbance of animals ashore may be one of the most important factors affecting harbor seal. Harbor seals come ashore for resting in between foraging trips and also come ashore during molt to help increase skin temperature and hair development. Females haul out when giving birth to pups and to allow the pups to suckle and rest. Haul-out sites, therefore, are critical habitats for harbor seals, and they probably choose these sites based on freedom from disturbance and potential predators, proximity to feeding areas and deeper water, stability of substrate, and visibility of approaching terrestrial predators. NOAA Fisheries guidelines specify 330 feet as the closest distance that persons can approach pinnipeds without affecting behavior, which is considered a take under the Marine Mammal Protection Act.

Harbor seals are known to forage in Gannon Slough; however, there are no haul-out sites within one mile of the BSA recorded in the CNDDB (CNDDB 2005) or known by biologists with the Humboldt Bay National Wildlife Refuge (Smith, pers. comm.).

ENVIRONMENTAL CONSEQUENCES

Impacts of the Build Alternatives to locally occurring common plants and animals would consist of the loss of previously degraded wetland habitat within the Route 101 right-of-way. Alternatives 2, 3, and Modified Alternative 3A would occupy a larger footprint than Alternatives 1 and 1A, which would result in more habitat loss than Alternatives 1 and 1A. Alternative 3 would have a larger footprint than Modified Alternative 3A due to the disturbance associated with the signalized intersection at Airport Road.

Modified Alternative 3A would disturb approximately five acres less than Alternative 3, and three acres less than Alternative 2. Impacts of these alternatives would result in localized effects to species that utilize the BSA.

The project area is at the edge of higher quality habitat. The adjacent Humboldt Bay National Wildlife Refuge, west of the project area, and the adjacent Fay Slough Wildlife Area east of the project area, supports a large diversity of plants and animals, some of which are special status species. All "Build" Alternatives would affect edges of potential habitat along the highway and outside the areas of higher quality habitat. These project Alternatives would occur mostly in areas that are currently disturbed. Avoidance and minimization measures for wetlands and special status species, described previously, would also apply to non-special status plant and animal species.

All "Build" Alternatives would have minimal effects to wildlife within the project area. Due to current high traffic levels, construction activity is not expected to contribute any substantial increase in disturbance to birds nesting adjacent to the project area. To further minimize noise effects on wildlife, Caltrans would implement appropriate standard construction practices, which include noise minimization measures.

Construction Noise

Project construction would generate noise that could cause temporary displacement of wildlife. Construction noise levels that may affect wildlife are described based on average (Leq) and maximum (Lmax) noise levels. The BSA has existing traffic noise. Although construction would temporarily increase these noise levels, the maximum noise increases due to construction activities are within the range of the already existing maximum traffic noise. Construction noise levels drop off at a rate of about 6 decibels (dBA) per doubling distance; additionally ground absorption of noise, shielding features, and atmospheric conditions could result in higher drop off rates.

Temporary construction noise would not impact listed terrestrial species. There are no known rookery sites for California brown pelican in the BSA. Therefore, temporary construction noise may disrupt roosting birds, but would not affect their breeding efforts. To further minimize noise effects on wildlife, Caltrans would implement appropriate standard construction practices, which include noise minimization measures.

Underwater noise impacts (barotrauma) associated with the proposed project are addressed in Chapter 3, Section 3.2.7 – Noise and in Chapter 3, Section 3.3.5— Threatened and Endangered Species.

AVOIDANCE, MINIMIZATION, AND/OR MITIGATION MEASURES

Standard construction practices would be implemented, which include noise minimization measures to minimize noise effects on wildlife. For additional construction noise discussion, refer to Chapter 3, Section 3.2.7 – Noise, and Chapter 3, Section 3.3.5 – Threatened and Endangered Species.

It is likely that migratory birds nest in the BSA. To avoid adverse effects to migratory birds, the removal of any suitable nesting habitat (grasses, shrubs and trees) would take place between September 1 and March 1, outside the nesting season. Exclusionary devices would be installed on the bridges before February 15, or nest removal conducted every 2-3 days during the nesting season (February 15 through September 1) to deter nesting cliff and barn swallows.

Migratory Birds

The following avoidance and minimization measures would reduce the potential effects on migratory birds and bats:

- Exclusionary devices would be installed on the bridges before February 15 or nest removal conducted every 2-3 days during the nesting season (February 15 through September 1) to deter nesting cliff and barn swallows.
    - Netting material would not be used as an exclusionary device.
    - If nest removal strategy is implemented, a qualified biologist would survey the bridge before nest removal to ensure the nest is not occupied.
- Vegetation would be removed outside of the bird breeding season (September 2 through February 14). If vegetation has not been cleared outside of the breeding season (if cleared between February 15 and September 1), the following guidelines would be observed:
    - No earlier than two weeks prior to construction, a qualified biologist would conduct migratory bird surveys to identify nesting birds within a 300 foot buffer of the project construction area.
    - If active bird nests were found during pre-construction surveys:
        - A qualified biologist would coordinate with CDFW to establish the appropriate buffer for specific species.
        - A buffer would be delineated around each active nest, and construction activities within the buffer area would not occur.

- A qualified biologist would monitor the active nest for disturbance during construction and nesting chronology.

In addition to establishing and delineating Environmentally Sensitive Areas on project plans and specifications (as discussed in Section 4.1), Best Management Practices to minimize indirect impacts to special status fish (such as a reduction in water quality) would include construction pollution, spill, and erosion guidelines as discussed in Chapter 3, Section 3.2.2—Water Quality and Stormwater Runoff.

3.3.5 Threatened and Endangered Species

REGULATORY SETTING

The primary federal law protecting threatened and endangered species is the Federal Endangered Species Act (FESA) (16 United States Code (USC), Section 1531, et seq. See also 50 CFR Part 402.) This act, and subsequent amendments, provide for the conservation of endangered and threatened species and the ecosystems upon which they depend. Under Section 7 of this Act, federal agencies, such as the Federal Highway Administration (FHWA), are required to consult with the U.S. Fish and Wildlife Service (USFWS) and the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NOAA Fisheries) to ensure they are not undertaking, funding, permitting or authorizing actions likely to jeopardize the continued existence of listed species, or destroy or adversely modify designated critical habitat. Critical habitat is defined as geographic locations critical to the existence of a threatened or endangered species. The outcome of consultation under Section 7 is a Biological Opinion or an Incidental Take statement. Section 3 of FESA defines take as "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect or any attempt at such conduct."

California has enacted a similar law at the state level: the California Endangered Species Act (CESA), California Fish and Game Code, Section 2050, et seq. CESA emphasizes early consultation to avoid potential impacts to rare, endangered, and threatened species and to develop appropriate planning to offset project-caused losses of listed species populations and their essential habitats. The California Department of Fish and Wildlife (CDFW) is the agency responsible for implementing CESA. Section 2081 of the Fish and Game Code prohibits "take" of any species determined to be an endangered species or a threatened species. Take is defined in Section 86 of the Fish and Game Code as "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill." CESA allows for take incidental to otherwise lawful development projects; for these actions an incidental take permit is issued by CDFW. For species listed under both FESA and CESA requiring a Biological Opinion under Section 7 of the FESA, CDFW may also authorize impacts to CESA species by issuing a Consistency Determination under Section 2080.1 of the Fish and Game Code.

Another federal law, the Magnuson-Stevens Fishery Conservation and Management Act of 1976, was established to conserve and manage fishery resources found off the coast, as well as anadromous species and Continental Shelf fishery resources of the United States, by exercising (A) sovereign rights for the purposes of exploring, exploiting, conserving, and managing all fish within the exclusive economic zone established by Presidential Proclamation 5030, dated March 10, 1983, and (B) exclusive fishery management authority beyond the exclusive economic zone over such anadromous species, Continental Shelf fishery resources, and fishery resources in special areas.

AFFECTED ENVIRONMENT

Existing records of special status animal species occurrences were consulted prior to conducting a site reconnaissance survey to determine which species have the potential to occur within the BSA. The following sources were consulted:

> U. S. Fish & Wildlife Service (USFWS) species list for Fields Landing, McWhinney Creek, Arcata South, Arcata North, Eureka, Tyee City, Blue Lake, Korbel, Iaqua Buttes and Cannibal Island USGS 7.5 minute quadrangles dated November 20, 2014, and species list from IPaC Trust Resource Report website May 5, 2016., updated November 1, 2016 See Appendix H for the complete species list.
>
> National Marine Fisheries Service provided a species list for the project on November 1, 2016. See Appendix H for the complete species list.
>
> CNDDB (CDFW 2014) occurrence records from the Fields Landing, McWhinney Creek, Arcata South, Arcata North, Eureka, Tyee City, Blue Lake, Korbel, Iaqua Buttes and Cannibal Island USGS 7.5 minute quadrangles.

Based on the above sources, it was determined that no focused surveys for special status animal species were necessary. The terrestrial habitats in the BSA have limited potential to support special status animal species due to regular disturbance from roadway maintenance activities, such as mowing. None of the special status terrestrial animal species (with the exception of the California brown pelican) have been documented within the BSA and these species are not likely to occur because of the lack of suitable habitats. The California brown pelican does not breed in northern California; they forage over shallow and deepwater habitats, and roost on structures such as breakwaters and pilings that are not found in the BSA. Therefore, although California brown pelican occur in the project vicinity, they would only occur in the BSA in flight or temporarily roosting. Special status species such as tidewater goby, Southern Oregon/Northern California Coast coho salmon, northern California steelhead trout, California Coastal Chinook salmon, coastal cutthroat trout, and red-legged frog are known to be present in the sloughs, streams, and ditches in the BSA. The proposed action is likely to directly or indirectly affect these aquatic species.

Although the longfin smelt, green sturgeon, and Pacific eulachon also have habitat in or near the BSA, measures would be taken to avoid affecting these species.

Based on survey results, scope of work and public resource agency consultations, the following determinations were made for each species. Details can be found below and in the Natural Environment Study 2016.

Table 3-32 Federally and State Listed or Candidate Species Potentially Occurring in the Vicinity of the Biological Study Area (Based on Records Review)

Scientific Name	Common Name	Status			General Habitat Description/ Flowering Period	Habitat and/or Species Present/ Absent[d]	Rationale
		Federal[a]	State[b]	Rank[c]			
Plants							
Erysimum menziesii	Menzies' wallflower	E	E	1B.1	Coastal dunes; Mar-Apr	A	No habitat present
Layia carnosa	beach layia	E	E	1B.1	Coastal dunes, coastal scrub, mostly in sandy areas; Mar-Jul	A	No habitat present
Lilium occidentale	western lily	E	E	1B.1	Bogs and fens, coastal bluff scrub, coastal prairie, coastal scrub, freshwater marshes and swamps, North Coast coniferous forest; June-July	HP	Potentially suitable habitat present, but surveys found none present within BSA
Noccaea fendleri ssp. *californica*	Kneeland prairie pennycress	E	None	1B.1	Broadleaf upland forest, coastal prairie (serpentinite); May-June	A	No habitat present
Mammals							
Corynorhinus townsendii	Townsend's big-eared bat	None	C SSC	N/A	Wide variety of habitats including coniferous forest, mixed mesophytic forests, deserts, native prairies, riparian communities, agricultural areas, and coastal habitat types.	HP	Foraging habitat present but no maternal roosting habitat (i.e., nursery colonies) within the BSA

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Scientific Name	**Common Name**	**Status**			**General Habitat Description/ Flowering Period**	**Habitat and/or Species Present/ Absent[d]**	**Rationale**
		Federal[a]	**State[b]**	**Rank[c]**			
Eumetopias jubatus	Steller sea lion	D	None	N/A	Isolated shoreline and rocky islands; major rookeries are designated critical habitat. Cape Mendocino is the closest area designated as critical habitat.	A	No haul-out sites or rookeries occur in the BSA
Pekania (Martes) pennanti	fisher, West Coast DPS	PT	C	N/A	Northern coniferous and mixed forest from Yukon to the Central Valley of California.	A	No habitat present
Birds							
Brachyramphus marmoratus	marbled murrelet	T	E	N/A	Mature Douglas fir and redwood forest within 56 km (35 mi) of the coast, open ocean. The BSA is not within critical habitat for this species.	A	No habitat present
Charadrius alexandrinus nivosus	western snowy plover	T	SSC	N/A	Coastal beaches, sandy areas near estuaries, salt ponds, river mouths, and levees along inland salt ponds. The BSA is not within critical habitat for this species.	A	No habitat present
Coccyzus americanus occidentalis	western yellow-billed cuckoo	PT	E	N/A	Forest to open riparian woodlands.	A	No habitat present

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Scientific Name	**Common Name**	**Status**			**General Habitat Description/ Flowering Period**	**Habitat and/or Species Present/ Absent[d]**	**Rationale**
		Federal[a]	**State[b]**	**Rank[c]**			
Haliaetus leucocephalus	bald eagle	D	E FP	N/A	Nests and roosts in large diameter trees or snags near large water bodies where prey is abundant.	HP	Potential to occur; roosting and foraging habitat present
Pelecanus occidentalis californicus	California brown pelican	D	D FP	N/A	Nest on coastal island lacking ground predators; roost on piers, buoys, and other structures on water bodies near the coast.	HP	Potential to occur; roosting habitat present
Rallus longirostris obsoletus	California clapper rail	E	E FP	N/A	Salt water and brackish marshes traversed by tidal sloughs. Associated with pickleweed.	HP	Habitat present but no longer known to occur in vicinity of Humboldt Bay
Riparia riparia	bank swallow	None	T	N/A	Colonial nester primarily in riparian and other lowland habitats west of the desert. Requires vertical banks/cliffs with fine textured/sandy soils near streams, rivers, lakes, ocean to dig nesting hole.	A	No habitat present

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		Federal[a]	**State[b]**	**Rank[c]**			
Strix occidentalis caurina	northern spotted owl	T	C	N/A	Mature old growth forests, conifers, wooded canyons. The BSA is not within critical habitat for this species.	A	No habitat present
Fish							

Table 3-32 Federally and State Listed or Candidate Species Potentially Occurring in the Vicinity of the Biological Study Area (Based on Records Review)

Scientific Name	**Common Name**	**Status**			**General Habitat Description/ Flowering Period**	**Habitat and/or Species Present/ Absent[d]**	**Rationale**
		Federal[a]	**State[b]**	**Rank[c]**			
Acipenser medirostris	green sturgeon-Southern DPS	T CH	SSC	N/A	Pacific Ocean, spawn in large permanent coastal streams and rivers. Spawn and rear in freshwater rivers. Preferred spawning substrate is large cobble, but can range from clean sand to bedrock. No known spawning in Humboldt Bay tributaries.	HP (foraging)	Humboldt Bay provides suitable foraging habitat for adults and sub-adults. Tidal sloughs in the BSA are designated critical habitat up to the head of the tide in Jacoby Creek, up to tide gates in the other tributaries, and the Mad River Slough. However, it is highly unlikely that green sturgeon of any life stage would be expected to occur in the shallow channels of the action area
Eucyclogobius newberryi	tidewater goby	E CH	SSC	N/A	Estuaries and lagoons of coastal creeks with low salinity.	HP P	Habitat present within the BSA, known to occur in Gannon Slough, Jacoby Creek and the 101 Slough

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Scientific Name	**Common Name**	**Status**			**General Habitat Description/ Flowering Period**	**Habitat and/or Species Present/ Absent[d]**	**Rationale**
		Federal[a]	**State[b]**	**Rank[c]**			
Oncorhynchus kisutch	coho salmon - Southern Oregon/ Northern California Coast ESU	T CH	T SSC	N/A	Pacific Ocean, near shore marine zone and riverine and estuarine areas. Spawn and rear in freshwater rivers and streams. Juveniles prefer deep (> 1 m) pools with dense overhead cover and clear water. Found over a range of substrates from silt to bedrock. Requires cool water temperatures for spawning, egg-incubation, and juvenile rearing. Spawn in riffles with gravel and cobble substrates.	HP P	EFH and critical habitat present within the BSA. Known to occur in Gannon Slough, Jacoby Creek, 101 Slough, and Rocky Gulch (upgradient of Brainard Slough).
Oncorhynchus mykiss	steelhead - Northern California DPS	T CH	SSC	N/A	Pacific Ocean, spawn in coastal streams and rivers, over gravel beds. Spawn and rear in freshwater rivers and streams. Juveniles prefer deep (> 1 m) pools with dense overhead cover, and clear water. Requires cool water temperatures for spawning, egg-incubation and juvenile rearing. Spawn in riffles with gravel and cobble substrates.	HP P	EFH and critical habitat present within the BSA. Known to occur in Gannon Slough, Jacoby Creek, 101 Slough, and Rocky Gulch (upgradient of Brainard Slough).

Table 3-32 Federally and State Listed or Candidate Species Potentially Occurring in the Vicinity of the Biological Study Area (Based on Records Review)

Scientific Name	**Common Name**	**Status**			**General Habitat Description/ Flowering Period**	**Habitat and/or Species Present/ Absent[d]**	**Rationale**
		Federal[a]	**State[b]**	**Rank[c]**			
Oncorhynchus tshawytscha	Chinook salmon - California Coastal ESU	T CH	None	N/A	Pacific Ocean, spawn in large permanent coastal streams and rivers, over gravel beds. Spawn and rear in freshwater rivers and streams. Requires cool water temperatures for spawning, egg-incubation and juvenile rearing. Spawn in riffles with gravel and cobble substrates.	HP	EFH and Critical Habitat present within the BSA. No recent Chinook spawning has been documented within tributaries of the BSA; however, non-natal juvenile Chinook salmon may periodically use Gannon Slough, Jacoby Creek, Brainard Slough and the 101 Slough for rearing. They are likely to be limited in number and their residence time given their ocean-type life history.
Spirinchus thaleichthys	longfin smelt	C	T SSC	N/A	Spawn in freshwater or slightly brackish water between Feb-Apr in areas with gravel or sandy substrate where rocks and aquatic plants are present. Eggs hatch ± 40 days and larvae are washed downstream into the estuary.	HP	Habitat present within the BSA, may occur in Gannon Slough, Jacoby Creek, Brainard Slough and the 101 Slough during spawning season
Thaleichthys pacificus	Pacific eulachon Southern DPS	T	SSC	N/A	Spawn in freshwater mid-winter through mid-spring. Eggs hatch in 20 to 40 days. Larvae carried downstream by currents shortly after hatching.	HP	Habitat present within the BSA, may occur in Gannon Slough and Jacoby Creek during spawning season

[a] **Federal Status Codes:**

E = Endangered. Species in danger of extinction throughout all or a significant portion of its range.
T = Threatened. Species likely to become endangered within the foreseeable future.
PT = Proposed Threatened.
Candidate species that have been found to warrant federal listing as threatened and have been officially proposed as such.
C = Candidate. Species that are undergoing a status review for consideration for federal listing.
D = Delisted. Species that have been removed from federal endangered and threatened species lists.
SC = Species of Concern. Species about which NOAA Fisheries has some concerns regarding status and threats,
but for which insufficient information is available to indicate a need to list the species under the Federal Endangered Species Act.
CH = Critical Habitat present in BSA.

[b] **California Status Codes:**

E = Endangered. Species whose continued existence in California is in jeopardy.
T = Threatened. Species likely to become endangered within the foreseeable future.
C = Candidate for listing. Species that are undergoing a status review for consideration for state listing.
FP = Fully protected and protected species defined in the State of California under Sections 3511 and 4700 of the Fish and Game Code.
SSC = CDFW Species of Special Concern

[c] **California Rare Plant Ranks**

1B.1 = Plants that are rare, threatened, or endangered in California and elsewhere.
Threat rank of 0.1 is considered seriously threatened in California
NA = Not Applicable

[d] **Habitat Determination Codes:**

A = Absent. Not likely to occur within the BSA due to lack of suitable habitat.
P = Species known to be present within BSA
HP = Habitat Present.
Plants: known to have occurred historically in the BSA, but may be extirpated.
Fish: status of population in BSA not presently known.
Other wildlife: potential to occur based on presence of supporting foraging and/or breeding habitat.
Specific occurrence data for the BSA may not have been found.

Southern Oregon/Northern California Coast ESU Coho Salmon

The Southern Oregon/Northern California Coast (SONCC) coho salmon (*Oncorhynchus kisutch*) is federally and state listed as threatened. The NOAA Fisheries classifies and lists salmon and steelhead by Evolutionarily Significant Unit (ESU). "To be considered an ESU, a population or group of populations must (1) be substantially reproductively isolated from other populations, and (2) contribute substantially to the ecological or genetic diversity of the biological species" (Myers et al. 1998). Factors used in determining ESUs include spatial, temporal, genetic isolation, maturation rates, and other life history traits.

The SONCC ESU for coho includes coho salmon from Cape Blanco in southern Oregon to Punta Gorda in northern California. Coho salmon are typically associated with small to moderately-sized coastal streams characterized by heavily forested watersheds; perennially-flowing reaches of cool water; dense riparian canopy; deep pools with abundant overhead and in-stream cover, undercut banks, and gravel or cobble substrates. Rivers in this ESU have short duration of peak flows and relatively low flows compared to rivers farther north. Adult salmon typically begin migration from the ocean to freshwater after heavy late-fall or winter rains breach the sand bars at the mouths of coastal streams. Migration continues to March, generally peaking in December and January, with spawning occurring shortly after returning to the spawning ground. Coho salmon in this ESU are at risk from agricultural and forestry practices, water diversions, urbanization, mining, severe flooding, and non-native, predatory fish (Weitkamp, et. al. 1995). This species is present in the tributaries to Arcata and Humboldt Bay.

Humboldt Bay, which includes Arcata Bay and its tributaries, are designated by NOAA Fisheries as critical habitat for coho salmon. In addition, Humboldt Bay and its tributaries are designated as Essential Fish Habitat (EFH), pursuant to Section 305(b)(20) of the Magnuson-Stevens Fisheries Conservation and Management Act.

Northern California Steelhead

Northern California steelhead (*Oncorhynchus mykiss*) ESU is federally listed as threatened and is a state species of concern. It occupies river basins from the Gualala River in Sonoma County, and north to Redwood Creek in Humboldt County, which is north of Humboldt Bay in the vicinity of the project. Within the range of West Coast steelhead, spawning migrations occur throughout the year, with seasonal peaks of activity; these runs are usually named for the season in which the peak occurs. Steelhead within this ESU comprise winter and summer steelhead, including what is presently considered to be the southernmost population of summer steelhead in the Middle Fork Eel River.

In the Pacific Northwest, steelhead that enter fresh water between May and October are considered summer steelhead, and steelhead that enter fresh water between November and April are considered winter steelhead.

The northern California steelhead ESUs' greatest threats come from poor land management practices that cause sedimentation and channel restructuring, genetic introgression from hatchery stock, and the non-native, predatory pike minnow (*Ptychocheilus* spp.) (Busby et al. 1996).

Northern California steelhead are likely to occur in the project area at Jacoby Creek and Gannon Slough. The northern California steelhead also may occur in the 101 Slough located immediately adjacent to the BSA.

Tributaries to Humboldt Bay are designated steelhead critical habitat. Watercourses in the project area constitute EFH for this species.

California Coastal Chinook Salmon

The California Coastal ESU of Chinook salmon is federally listed as threatened. Its range encompasses the California coast from Redwood Creek in Humboldt County south to the Russian River, north to the Mad River, and including Humboldt Bay in the project vicinity. Chinook salmon in this ESU exhibit an ocean-type life-history; the low flows, high temperatures, and barrier bars that develop in smaller coastal rivers during the summer months block movement by anadromous fish and favor an ocean-type life. The majority of fish immigrate to the ocean as sub yearlings. Adults return as 3- and 4-year old fish, with a small proportion of 5-year olds. Fall-run upstream migration occurs from June through December with a peak in September and October. Spawning occurs from late-September through December with a peak in late-October. The Chinook salmon in this ESU are at risk from agricultural and forestry practices, water diversions, urbanization, mining, and severe flooding (Myers et al. 1998). California Coastal Chinook salmon are likely to occur in the project area at Jacoby Creek and Gannon Slough. The Chinook salmon may also occur in the 101 Slough.

Tributaries to Humboldt Bay are designated Chinook salmon critical habitat. Watercourses in the project area constitute EFH for this species. The project activity would have a temporary, minor adverse effect on critical habitat and EFH.

Longfin Smelt

The San Francisco Bay-Delta population of longfin smelt (*Spirinchus thaleichthys*) was petitioned for federal listing in 2008. On April 9, 2009, the U.S. Fish and Wildlife Service (USFWS), announced a 12-month finding that the San Francisco Bay-Delta population of the longfin smelt does not meet the definition of a Distinct Population Segment (DPS), as identified in their DPS policy (61FR 4721, February 7, 1996). As a result, listing the species as a DPS is not warranted. However, USFWS is initiating a status assessment of the longfin smelt, and are soliciting information on the status of the species range-wide. In April 2009, longfin smelt was listed as threatened by the State of California.

Longfin smelt inhabit open waters of bays and spawn in estuaries in fresh or slightly brackish water where they deposit their eggs on sandy, gravel, cobble, or plant substrates at the bottom of deep channel habitats. Most spawning occurs between January and March. During summer months, longfin smelt migrate to nearshore marine habitats.

Pacific Eulachon

The Southern Distinct Population Segment (DPS) of Pacific eulachon (*Thaleichtyus pacificus*) is federally listed as threatened. Critical habitat has not been designated for eulachon. EFH is not defined for this species because it is not a commercially-managed fish. This species is endemic to the eastern Pacific Ocean, ranging from northern California to southwest Alaska and into the southeastern Bering Sea. In California, eulachon have been documented in the Sacramento River, Russian River, Humboldt Bay and several nearby smaller coastal rivers (e.g., Mad River), and the Klamath River.

Eulachon spawn in fresh water from mid-winter through late spring. Prior to spawning, they spend their adult lives (3 to 5 years) in saltwater. Most eulachon adults die after spawning. After eggs are fertilized in the water column, they sink to the river bottom and adhere to gravel and coarse sand. The eggs hatch in 20 to 40 days and the larvae are carried downstream to be dispersed by estuarine and ocean currents shortly after hatching.

Green Sturgeon

The southern DPS of North American green sturgeon (*Acipenser medirostris*) is federally listed as threatened. The DPS structure for green sturgeon includes (1) a northern DPS consisting of populations originating from coastal watersheds northward of and including the Eel River; and (2) a southern DPS consisting of populations originating from coastal watersheds south of the Eel River, with the only known spawning population in the Sacramento River (74 FR 52300). In the April 7, 2006 listing notification, the northern DPS was identified as a NOAA Fisheries Species of Concern but was not listed under the ESA.

Southern DPS North American green sturgeon migrate up rivers to spawn between late February and late July. The spawning period is March-July, with a peak from mid-April to mid-June (Emmett et al., 1991). Juveniles migrate out to sea when they are 1 to 4 years old, although a majority apparently leave as yearlings (USFWS 1982). Green sturgeon are known to forage in estuaries and bays ranging from San Francisco Bay to British Columbia. Humboldt Bay and its estuaries are used for foraging by sub-adults and adults; however, there is no known spawning in drainages that feed into the Humboldt Bay system. Green sturgeon could occur in Gannon Slough during high tide, but they are not likely to be present in the Jacoby Creek estuary or elsewhere in the project area. This action would have no effect on green sturgeon since work in Gannon Slough would be conducted at low tide when water is too shallow for them to be present.

On October 11, 2009, NOAA Fisheries designated critical habitat for the federally threatened southern DPS of North American green sturgeon (southern DPS of green sturgeon) pursuant to Section 4 of the Endangered Species Act of 1973. For the southern DPS, critical habitat encompasses coastal bays and estuaries from Monterey Bay, California to the Strait of Juan de Fuca in Washington. The project site is located adjacent to Humboldt Bay, an area included as critical habitat. Some primary constituent elements (PCEs) of green sturgeon critical habitat, such as prey species, may be found within the project area.

Tidewater Goby

The tidewater goby (*Eucyclogobius newberryi*) is federally listed as endangered and is a state species of concern. It is a benthic species that inhabits shallow lagoons and the lower reaches of coastal streams where the water is brackish (salinities usually <10 parts per thousand) to fresh, and slow-moving or fairly still (Miller and Lea 1972; Moyle 1976; Swift 1980; Wang 1982; Irwin and Soltz 1984). The presence of backwater, marshy habitats where they can avoid winter flood flows, is particularly important for their persistence in the lagoons. It differs from other species of gobies in California in that it is able to complete its entire, predominately annual, life cycle in fresh or brackish water (Wang 1982; Irwin and Soltz 1984; Swift et al. 1989). Their diet consists mostly of small crustaceans, aquatic insects, and mollusks (Swift 1980; Wang 1982, 1986; Irwin and Soltz 1984; Swift et al. 1989). The tidewater goby is endemic to California and is distributed in brackish-water habitats along the California coast from San Diego County to Del Norte County (Swift 1980; Swift et al. 1989). The loss or degradation of coastal salt marsh and coastal lagoon habitat due to coastal development projects is currently the major factor affecting tidewater goby populations. Individual tidewater goby populations have a high potential for extinction because the populations are relatively small and isolated and most estuaries or lagoons are affected by human activity. Population extinctions can occur rapidly, given the goby's short life cycle and specialized habitat requirements.

This species is documented by the USFWS from a number of known locations within the BSA, including the mouth of Jacoby Creek, Gannon Slough, and the 101 Slough (USFWS 2006). In Gannon Slough, they can be found inland of the BSA in less saline waters. Surveys were also conducted in a ditch adjacent to Jacobs Avenue in the southern part of the project area (at PM 80) by the USFWS in 2001, however no tidewater gobies were found. Designated critical habitat for tidewater goby is located within the project construction area. Essential Fish Habitat (EFH) is not defined for this species because it is not a commercially-managed species.

Summary of Endangered Species Act Section 7 Consultation with U.S. Fish and Wildlife Service for Tidewater Goby

On February 24, 2004, Ray Bosch and Greg Goldsmith of USFWS assessed the project site. At that time, it was decided that potential effects to tidewater goby could result from implementation of the proposed project. Consequently, a formal Section 7 Consultation was initiated for impacts to tidewater goby.

In August and September 2006, protocol tidewater goby surveys were conducted at Gannon Slough and the Route 101 Slough; no tidewater goby populations were found. Previous surveys had found them at these locations within the BSA and at Jacoby Creek. A survey of the area behind the tide gate at Old Jacoby Creek found no gobies present.

On May 28, 2008, Caltrans received a Biological Opinion (BO) from USFWS with the conclusion that the action was not likely to jeopardize the continued existence of the goby. After the BO issued, Caltrans modified the project description, which included additional avoidance and minimization measures as detailed in this document.

In May 2010, a revised Biological Assessment (BA) for the tidewater goby was finalized and submitted to USFWS. The BA documented how the proposed action may directly, indirectly or cumulatively affect special status species or their habitat found on or near the proposed action, and determined the project was Likely to Adversely Affect tidewater goby. This BA was prepared in accordance with requirements set forth under Section 7 of the Endangered Species Act (19 U.S.C. 1536 (c)). To satisfy these requirements, emphasis was placed on the analysis of effects related to tidewater goby and designated critical habitat.

A revised Biological Opinion (BO) concurring with the Likely to Adversely Affect determination was issued on November 22, 2010 from the USFWS, which included measures to avoid and minimize harm to the tidewater goby during construction. The BO concluded that the proposed project was not likely to jeopardize the continued existence of the goby and was not likely to destroy or adversely modify critical habitat. The USFWS BO is in Appendix I.

The project previously included dewatering/diversion, excavation, and pile driving within Jacoby Creek. These activities were removed from the project. The only in-stream work that could potentially result in lethal take of a listed species is the removal of piers and maintenance of the containment system associated with the southbound Jacoby Creek bridge. Incidental take of tidewater goby could occur as a result of construction workers walking in the wetted channel of Jacoby Creek during demolition of the old southbound Jacoby Creek bridge over a 25-week construction period; however, the anticipated level of take is low (estimated at 20 adult gobies and 20 nest burrows with eggs or young) and not likely to result in jeopardy to the tidewater goby, or destruction or adverse modification of tidewater goby critical habitat. The Incidental Take Statement for tidewater goby was included in the Biological Opinion issued for the project by US Fish and Wildlife Service (USFWS 2010).

Summary of Endangered Species Act Section 7 Consultation with the National Oceanic and Atmospheric Administration (NOAA) Fisheries for Listed Salmonid Species

On March 4, 2004, Mike Kelly of NOAA Fisheries visited the project site. At that time it was determined that formal Section 7 consultation with NOAA Fisheries for the aforementioned listed salmonids (belonging to the family *Salmonidae*, which includes salmon and trout) was necessary. Technical assistance from the CDFW determined no lethal take of state-listed species was anticipated. Therefore, a Section 2080.1 consistency determination with CDFW was not required.

In May 2010, a Biological Assessment (BA) for various fish species was finalized and submitted to NOAA Fisheries. The BA documented how the proposed action could directly, indirectly or cumulatively affect special status species or their habitat found on or near the proposed action. This BA was prepared in accordance with requirements set forth under Section 7 of the Endangered Species Act (19 U.S.C. 1536 (c)). To satisfy these requirements, emphasis was placed on the analysis of effects related to the green sturgeon (*Acipenser medirostris*, southern DPS), Chinook salmon (*Oncorhynchus Tshawytscha*, California Coastal ESU), coho salmon (*Oncorhynchus kisutch*, Northern California/Southern Oregon Coast ESU), and steelhead trout (*Oncorhynchus mykiss*, Northern California ESU), all federally-listed threatened species. Assessment of impacts to critical habitat was also included. Impacts to Essential Fish Habitat for commercially-managed species were also evaluated as required by recent amendments to the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA).

A Letter of Concurrence from NOAA Fisheries issued on January 22, 2011. NOAA Fisheries concluded the Federal Endangered Species Act process with a letter summarizing the informal consultation process instead of issuing a BO. The letter concluded the proposed project may affect, but is not likely to adversely affect threatened coho salmon, Chinook salmon, steelhead, green sturgeon, or their designated critical habitats. In addition, NOAA Fisheries concluded the potential project would adversely affect Essential Fish Habitat for Chinook and coho salmon; however, project effects would be minor. The NOAA Fisheries Informal Consultation letter is located in Appendix I.

In February 2016, a revised Biological Assessment (BA) for various fish species was finalized and submitted to NOAA Fisheries. The BA documented how the proposed action may directly, indirectly or cumulatively affect special status species or their habitat found on or near the proposed action. This BA was prepared in accordance with requirements set forth under Section 7 of the Endangered Species Act (19 U.S.C. 1536 (c)). To satisfy these requirements, emphasis was placed on the analysis of effects related to the green sturgeon (*Acipenser medirostris*, southern DPS), Chinook salmon (*Oncorhynchus tshawytscha*, California Coastal ESU), coho salmon (*Oncorhynchus kisutch*, Northern California/Southern Oregon Coast ESU), and steelhead trout (*Oncorhynchus mykiss*, Northern California ESU), all federally-listed threatened species. Assessment of impacts to critical habitat was also included.

Impacts to Essential Fish Habitat for commercially-managed species were also evaluated as required by recent amendments to the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA). The BA determined that the project may affect, but is not likely to adversely affect these listed species.

NOAA Fisheries issued a Letter of Concurrence on April 29, 2016, which concluded the Federal Endangered Species Act consultation process. The letter concluded the proposed project may affect, but is not likely to adversely affect federally listed Southern Oregon/ Northern California Coast coho salmon, California Coastal Chinook salmon, Northern California steelhead, Southern Distinct Population Segment of North American green sturgeon, or their designated critical habitats. In addition, NOAA Fisheries concluded the potential project would adversely affect Essential Fish Habitat for Pacific Salmon (Chinook and coho) salmon, Pacific Groundfish, and Coastal Pelagic Species; however, project effects would be minor.

ENVIRONMENTAL CONSEQUENCES

All Build Alternatives include replacing the southbound Jacoby Creek bridge. The new single span bridge would be constructed above the creek flow. After constructing the new southbound Jacoby Creek bridge, the existing bridge piers would be removed above the level of the stream substrate without excavation. Pile removal would take place during low tide so construction work would be at or slightly above waterline to minimize turbidity. In addition to the pile removal work, other in-stream work includes tide gate replacement at various locations and placement of a rock weir for fish habitat at Gannon Slough.

Heavy equipment within watercourses would be avoided. There is negligible potential for entrapment of fish since isolation casings would not be used for pier removal of the existing southbound Jacoby Creek bridge. This work would take place during summer months. (For more information about bridge construction details, see Chapter 2, Section 2.2)

During and after construction, exposed soil could result in sedimentation and erosion effects to watercourses. (See Chapter 3, Section 3.2.2—Water Quality and Storm Water Runoff for more information regarding water quality effects.)

Bridge Construction Noise Effects

The proposed bridge work would either involve bridge pile driving by vibratory rotating or oscillating outside of the creek channel. The in-channel work at Gannon Slough and Jacoby Creek may temporarily adversely affect any fish present since it may result in take (harassment and displacement). However, since fish habitat would not be affected, construction related adverse effects are not likely to jeopardize the continued existence of the species. In addition, the potential for take by direct mortality would be avoided by using vibratory pile installation with noise levels that fall below the threshold of barotrauma.

Also, there would be no in-water pile construction. Exposure to abrupt, extreme changes in water pressure (such as those caused by pile driving) can be harmful (or fatal) to fish. Injury sustained from these pressure changes is termed barotrauma. The criteria for injury to fish from vibratory driving are estimated differently from impact driving noise. In a personal communication (5-25-2009 email), David Woodbury, National Marine Fisheries Service Biologist writes:

> *National Marine Fisheries Service has not yet established a threshold for physical injury from accumulating underwater sound levels when a vibratory hammer is used. Based on the available scientific studies we have reviewed, it appears that the type of sound produced by an impact hammer (impulse) is more injurious to fish than that produced by a vibratory hammer (continuous). We have had some preliminary discussions of what a potential accumulated SEL [sound exposure level] threshold might be for a vibratory hammer and it will likely be substantially greater than the 183 (juvenile) / 187 (adult) dB SEL that we have established for impact hammers. So for now, only peak SPL [sound pressure level] is currently used to assess physical injury to fish when a vibratory hammer is used.*

Peak sound energy data collected from vibratory driving of 13-inch diameter steel pipe piles in the Mad River Slough (Illingworth and Rodkin, 2003) shows levels of 185 dB at 16 feet. The steel pipe piles that would be placed for abutments of the new southbound Jacoby Creek would be 12-inches to 24-inches in diameter. For a given pile size and type, a vibratory hammer produces sound energy that is generally 10 to 20 dB lower than impact pile driving (ICF Jones & Stokes et al. 2009). Data collected for the impact driving of 30-inch diameter steel pipe piles at the Richmond-San Rafael bridge (Reyff, J. A. 2003) yielded peak sound pressure levels of 205 at a distance of 13 to 16 feet. If those piles were installed with a vibratory rather than impact hammer, the peak sound pressure level would be around 195 dB (10 dB less than impact driving peak), well below the 206 dB threshold of injury to fish.

Potential Impacts to Threatened and Endangered Species

Determinations of potential effect were based on survey results, scope of work and public resource agency consultations. These determinations are summarized in Table 3-33, and explained below.

Table 3-33 Federal and California Endangered Species Acts Determinations

Scientific Name	Common Name	Determination
Plants		
Erysimum menziesii	Menzies' wallflower	Federal: No effect State: No effect
Layia carnosa	beach layia	Federal: No effect State: No effect
Lilium occidentale	western lily	Federal: No effect State: No effect
Noccaea fendleri spp. *californica*	Kneeland prairie pennycress	Federal: No effect State: NA
Mammals		
Corynorhinus townsendii	Townsend's big-eared bat	Federal: No effect State: No effect
Eumetopias jubatus	Steller sea lion	Federal: No effect State: NA
Pekania (Martes) pennant	fisher, West Coast DPS	Federal: No effect State: No effect
Birds		
Brachyramphus marmoratus	marbled murrelet	Federal: No effect State: No effect
Charadrius alexandrines nivosus	western snowy plover	Federal: No effect State: NA
Coccyzus americanus occidentalis	western yellow-billed cuckoo	Federal: No effect State: No effect
Haliaetus leucocephalus	bald eagle	Federal: No effect State: No effect
Pelecanus occidentalis californicus	California brown pelican	Federal: NA State: NA
Rallus longirostris obsoletus	California clapper rail	Federal: No effect State: No effect
Riparia riparia	bank swallow	Federal: NA State: No effect
Strix occidentalis caurina	northern spotted owl	Federal: No effect State: No effect
Fish		
Acipenser medirostris	green sturgeon - Southern DPS	Federal: may affect, not likely to adversely affect State: NA
Eucyclogobius newberryi	tidewater goby	Federal: may affect, likely to adversely affect State NA
Oncorhynchus kisutch	coho salmon – Southern Oregon/Northern California Coast ESU	Federal: may affect, not likely to adversely affect State: minimal impact
Oncorhynchus mykiss	steelhead – Northern California DPS	Federal: may affect, not likely to adversely affect State: NA
Oncorhynchus tshawytscha	Chinook salmon – California Coastal ESU	Federal: may affect, not likely to adversely affect

Scientific Name	Common Name	Determination
		State: NA
Spirinchus thaleichthys	longfin smelt	Federal: NA State: No take, minimal habitat impact
Thaleichthys pacificus	Pacific eulachon Southern DPS	Federal: No effect State: No effect
Critical Habitats		
Eucyclogobius newberryi	tidewater goby	Not likely to adversely modify
Oncorhynchus kisutch	coho salmon – Southern Oregon/Northern California Coast ESU	May affect, not likely to adversely affect
Oncorhynchus tshawytscha	Chinook salmon – California Coastal ESU	May affect, not likely to adversely affect
Oncorhynchus mykiss	steelhead – Northern California DPS	May affect, not likely to adversely affect
Acipenser medirostris	green sturgeon - Southern DPS	May affect, not likely to adversely affect
Essential Fish Habitat		
Essential Fish Habitat (EFH)	Pacific Coast Salmon	May adversely affect
Essential Fish Habitat (EFH)	Pacific Coast Groundfish	May adversely affect
Essential Fish Habitat (EFH)	Coastal Pelagic Species	May adversely affect

NA = Not Applicable, the species is not listed for Federal or State

Tidewater Goby. Tide gate replacement and rock weir construction work in Gannon Slough, and the replacement of the southbound Jacoby Creek bridge, may affect and are likely to adversely affect tidewater goby, but are not likely to jeopardize the continued existence of the species. Humboldt Bay and its tributaries are designated critical habitat for tidewater goby. Project construction would not likely destroy or adversely modify designated tidewater goby critical habitat, but would have minor, temporary effects.

Northern California Steelhead. Northern California steelhead are likely to occur in the project area and may be affected by work at Jacoby Creek and Gannon Slough. Tributaries to Humboldt Bay are designated steelhead critical habitat. Northern California steelhead may also occur in the 101 Slough located immediately adjacent to the BSA. They may be displaced due to construction activity and there may be a temporary increase in water turbidity. The project may affect, but is not likely to adversely affect steelhead salmon and its designated critical habitat.

Watercourses in the project area constitute Essential Fish Habitat (EFH) for this species. The project activity would have a temporary, minor adverse effect on EFH.

Coho Salmon. Coho salmon are present in Humboldt Bay and its tributaries. This species may be present in the BSA in the 101 Slough, Gannon Slough and Jacoby Creek. The proposed project may affect, but is not likely to adversely affect coho salmon and its critical habitat. The project activity would have a temporary, minor adverse effect on critical habitat and EFH.

Chinook Salmon. California Coastal Chinook salmon are likely to occur in the project area and may be affected by the bridge work at Jacoby Creek and Gannon Slough. Tributaries to Humboldt Bay are designated Chinook salmon critical habitat. Juvenile Chinook salmon may be displaced due to construction activity and temporary increase in turbidity. Chinook salmon may also occur in the 101 Slough (east and adjacent to Route 101). The project may affect, but is not likely to adversely affect Chinook salmon and its designated critical habitat. Watercourses in the project area constitute EFH for this species. The project activity would have a temporary, minor adverse effect on critical habitat and EFH.

Green Sturgeon. Humboldt Bay and its estuaries are used for foraging by sub-adults and adults; however, there is no known spawning in drainages that feed into the Humboldt Bay system. Green sturgeon could occur in Gannon Slough during high tide, but they are not likely to be present in the Jacoby Creek estuary or elsewhere in the project area. This project would have no effect on the green sturgeon since work in Gannon Slough would be done at low tide when water is too shallow for them to be present.

Some primary constituent elements (PCEs) of green sturgeon critical habitat, such as prey species, may be found within the project area. Water quality may be temporarily impacted by the placement of rock slope protection (RSP) and the tide gate at Gannon Slough. However, because impacts would be minor and short term, the project would not result in any substantial adverse modification of critical habitat for green sturgeon.

Longfin Smelt. Longfin smelt inhabit open waters of bays and spawn in estuaries in fresh or slightly brackish water where they deposit their eggs on sand, gravel, cobble, or plant substrates at the bottom of deep channel habitats. Most spawning occurs between January and March. During summer months, longfin smelt migrate to nearshore marine habitats. Longfin smelt would not be present within the project area during any in-water activities. The project would have no state take, but will have minimal habitat impact on longfin smelt.

Pacific Eulachon. The in-stream work at Jacoby Creek (pier removal) and Gannon Slough (placement of rock for fish habitat) would take place during summer months when eulachon are not present. The project would have no effect on the Southern Distinct Population Segment (DPS) of Pacific eulachon.

AVOIDANCE, MINIMIZATION, AND/OR MITIGATION MEASURES

This section describes the proposed avoidance and minimize measures to reduce project effects on federally and state listed fish species and EFH habitat. These avoidance and minimization measures are consistent with the Caltrans 2016 Biological Assessment (BA).

Seasonal Restrictions

- In-stream work within a bed, bank, or channel of a watercourse would be restricted to the period between July 1st and October 15th.
  - Construction activities restricted to this period include all tide gate replacements, rock weir construction at Gannon Slough, pile installation on the banks of Jacoby Creek for the new bridge and the detour bridge, and activities associated with workers potentially walking in Jacoby Creek to install/maintain the debris containment structure and remove old bridge piers.

- Any work performed within a wetted channel that involves placement of rock or workers walking within the channel (i.e., construction of rock weir at Gannon Slough, possible tide gate replacement, and construction/maintenance of containment systems for bridge demolition and bridge pier removal) would coincide with low flow and low tide events (outside of significant precipitation events and between the latter two hours of outgoing tides and beginning two hours of incoming tides).

- Limit in-stream work to low flow and low tide periods to minimize potential turbidity associated with workers walking in the channel or rock placement, and minimize exposure and avoid injury to fish that might otherwise be present when water levels are higher.

Tide Gates

Caltrans would contract a qualified consultant to conduct a hydraulic analysis of the slough channels for the Old Jacoby Creek, Brainard, and Gannon Sloughs where fish-friendly tide gates would be installed prior to construction to establish existing hydraulic conditions. All the new fish-friendly tides gates would be monitored by a qualified consultant for two years after installation. Monitoring would include flow levels and salinity to ensure the existing hydrological conditions are maintained or improved within the affected channels. For the first two years, Caltrans Maintenance would coordinate with the consultant to ensure appropriate operation and maintenance of the tide gates.

Bridge Work

- To avoid barotrauma to fish, no piles would be installed in the active, wetted channel for the new SB Jacoby Creek bridge. Piles would be vibrated, oscillated, or rotated into place on the bank 15 to 20 feet from the wetted channel. Impact driving would not be used.

- Piers from the old SB Jacoby Creek bridge would be cut above the low tide water level to avoid impacts to fish and fish habitat. The bridge piers would be removed without excavation or the use of isolation casing to minimize turbidity in the creek.
- To avoid and minimize impacts to the watercourses, all bridge debris would be contained. The demolition debris containment system may be mounted on the existing bridge piers, and/or placed on the stream banks outside the wetted channel. Containment would minimize the potential for bridge demolition debris to enter the watercourse.
- No construction equipment would work within the active, wetted creek channel; however, workers would need to walk within the stream to install, maintain, and remove the debris containment system. The contractor would be required to submit a demolition plan to the Resident Engineer for approval. The demolition plan would describe measures taken to restrict or minimize construction debris from entering the creek channel and to avoid or minimize the amount and extent of workers walking in the stream channel. The demolition plan would prohibit the use of any structure placed within the wetted channel of Jacoby Creek and require demolition activities coincide with low flow periods to minimize watercourse impacts.
- The contractor would be required to place temporary barrier fencing, or a similar form of visual barrier, along the entire length of the north and south banks of Jacoby Creek (within the vicinity of the SB and NB Jacoby Creek bridges) to minimize visual disturbance to fish and to prevent workers from crossing the creek during routine movements within the BSA. In addition, the contractor would build or install a temporary footbridge that workers may use to cross the creek without walking in the wetted channel. Both ends of the footbridge would be placed outside the wetted channel.
- Excavations for the temporary detour bridge abutments would be above the mean high tide line, avoiding the water of the active, wetted Jacoby Creek channel.
- To ensure adherence to all permit conditions and all minimization and avoidance measures are implemented, a biological monitor would be present during all in-stream activities associated with removal of the old SB Jacoby Creek bridge and piers. The biological monitor would also ensure the temporary footbridge and the visual barrier are properly installed and maintained.

Installation of Tide Gates

The following conservation measures were developed in consultation with USFWS and CDFW to minimize impacts to the federally listed tidewater goby and are appropriate for the protection of the listed salmonids addressed in the Caltrans 2016 BA.

- Tide gates would be installed during low tide (i.e., when old tide gates are out of the water) to minimize sediment release into waterways and to avoid fish that may occur at the tide gate sites when water is present.

- Before construction, a qualified consultant (approved by the USFWS and NOAA Fisheries) would assess pre-project hydrologic conditions upstream of the existing tide gates.
- The biological consultant would make the preliminary settings to the adjustable fish-friendly tide gates. Since the gates are being replaced because they no longer close effectively, the new adjustable gates would be opened enough to mimic the current hydrology. Once the tide gates are installed, upstream water conditions would be monitored daily and the adjustable gate would be opened or closed slightly until average weekly post-construction conditions are within 95 percent of pre-construction conditions.
- Monitoring and adjustment by a qualified consultant would continue for two years following tide gate installation. There would be no monitoring of water conditions at new tide gates that are not adjustable (i.e., tide gates at Jacobs Avenue and California Redwood Company ditches).

Best Management Practices Measures

Best Management Practices (BMPs) would be used to avoid and minimize impacts to water quality, aquatic habitat, and listed fish. These measures would conform to the provisions in sections 20-2 and 20-3 of the Caltrans Standard Specifications and the special provisions included in the contract for the proposed action. Such provisions would include preparation of a Storm Water Pollution Prevention Plan (SWPPP) and Water Pollution Control Plan (WPCP) prior to construction, which describe construction activities and illustrate the best BMPs for the proposed action. BMPs for the proposed action would include, but are not limited to, the following:

- Scheduling: construction activities involving soil disturbance would take place during dry weather conditions, generally between June 1 and October 15, to minimize sediment discharges to receiving waters. Furthermore, the SWPPP (prepared by the contractor prior to construction) would include a scheduling BMP that specifies: 1) the project schedule would sequence construction activities with the installation of both soil stabilization and sediment control measures; 2) BMPs would be deployed in a sequence to follow the progress of grading and construction; 3) the construction schedule would be arranged so that grading and construction occur during the dry summer months; and 4) proper scheduling would be done to avoid grading, landscaping application, pavement striping, concrete work, and asphalt paving from occurring immediately prior to forecast rain events.
- Preparation of Rain Event Action Plans (REAP) 48-hours prior to any forecasted precipitation to ensure adequate stabilization of equipment, materials, and soils would be completed.
- Any debris and sediment would be contained within the work site or diverted into a sedimentation basin before being returned to any receiving waters. Excess material excavated from the work site would be disposed off-site at an approved disposal site away from any stream course.

- Soil stabilization measures (mulching, straw wattles) would be implemented during and after construction to reduce sediment discharge from areas of disturbed soil. After construction, areas of bare soil would be seeded or planted with a non-persistent cereal grain and California native seed mix. Straw would be certified weed-free. These measures would provide immediate soil stabilization and subsequent vegetative cover until natural processes resume (i.e., next growing season).
- When construction is complete, watercourse banks would be returned to natural contours. The upper six inches of excavated material would be conserved and then replaced, and, if necessary, seeded and planted with native, regionally appropriate species. Revegetated areas would be monitored for up to four years or until 80 percent success rate is achieved.
- Silt fences, straw bales, and/or fiber rolls would be placed to control sediment discharge; minimal sediment would be released into receiving waters. Certified weed-free mulch, silt fences, straw bales, and/or fiber rolls would be applied to exposed soil areas for over-wintering protection from erosion.
- Measures would be taken to prevent construction equipment discharges from contaminating soil or waters in the construction site. Construction site entrances/exits would be stabilized and street sweeping performed to prevent tracking of sediment.
- Perimeter control for the temporary stockpiling of materials, soil, and debris that may contain potential contaminants (e.g., concrete debris, treated timbers). Excavated spoils would be controlled to prevent sedimentation to the stream.
- Use of geo-synthetic fabric (e.g., plastic, filter fabric) barriers to prevent the discharge of pollutants (sediment, oil and grease, etc.) when equipment is working adjacent to or over waterways.
- A temporary concrete washout facility would be placed on-site for concrete clean up. No concrete washings or water from concrete would be allowed to flow into waterways. No concrete would be poured within the waterways. Water that has come into contact with setting concrete would be pumped into a tank and disposed of at an approved disposal site.
- To control fugitive dust during construction, loose debris would be cleaned up using a vacuum truck (as opposed to a kick broom machine). Also, pavement would be removed by cold planing, using a machine that deposits grindings directly into a truck. The cutting teeth of the grinder would be lubricated with water, which is enough to minimize dust production, but not enough to create runoff.
- Preparation and implementation of a sampling and analysis plan for discharges during construction.
- Instead of conventional hydraulic fluids, non-toxic, biodegradable vegetable oil would be used for operating the hydraulic equipment (i.e., vibratory hammer) needed to install the bridge piles at Jacoby Creek. Vegetable oil would be used in other hydraulic equipment working over or adjacent (within 50 feet) to project watercourses as feasible.

- Only untreated wood timbers would be used for construction within 50 feet of the Ordinary High Water Level (OHWL).

Staging Areas

- Primary staging areas would be on Route 101 shoulders with possible additional staging areas on nearby private property. No staging area would occur within environmentally sensitive areas.
- Any vehicles stored within 150 feet of the OHWL of drainage facilities, watercourses, sloughs, or Humboldt Bay would have spill prevention measures in place for refueling. This includes placement of an absorbent boom around the fuel port (on machine being fueled), as well as a thick absorbent mat that is rolled out on the ground under the equipment to catch a larger spill. When fueling vehicles and other equipment, there would be a person at both the fuel nozzle and the truck valve so that emergency shut-off could be made if there was a nozzle or hose failure.
- Proper and timely maintenance of vehicles and equipment used during construction to reduce the potential for mechanical breakdowns leading to a spill of materials.
- All equipment remaining on the job site would have secondary containment placed beneath the drip zone when left overnight. Leaks would be immediately controlled with absorbent mats and repaired before equipment operates again. Clean up of petro-chemical drips would occur as soon as they are observed. All equipment would be monitored by the contractor daily for chemical leakage. To offer protection from storm events, Caltrans would require monitoring for storm events and the movement of equipment accordingly.
- For all night road work and paving operations that require the use of artificial light, light shields would be used to direct lighting toward the roadway and away from adjacent water bodies to avoid impacting the aquatic environment.

Conservation of Riparian Habitat

The following measures would be implemented to reduce potential impacts to riparian habitat in the BSA:

- The width of the construction disturbance zone within riparian areas would be minimized through careful pre-construction planning.
- Exclusionary fencing would be installed along the boundaries of all riparian areas and other environmentally sensitive areas (i.e., wetlands) to avoid impacts to these habitats outside of the project footprint.
- Riparian vegetation removal (e.g., tree trimming) would be restricted to the minimum needed for construction access.

- Once the bridge detour is removed, the median at Jacoby Creek would be replanted with native trees and shrubs and seeded with native herbaceous vegetation that are aptly suited to the project region.

All disturbed areas would be revegetated and restored to pre-construction conditions. Replanting would occur with native plant material indigenous to the area.

To minimize underwater noise impacts (barotrauma) to fish, only land-based vibratory, rotating, or oscillating pile driving would be used for the southbound Jacoby Creek bridge replacement. To reduce sedimentation, erosion control measures would be used on areas of exposed soil during and after construction. Details of minimization and avoidance measures have been determined with input from the USFWS, and are included as conditions in the biological opinion they issued. Additional conditions would be included in permits issued by regulatory agencies (USACE, CDFW, and RWQCB).

Construction best management practices (BMPs) would be implemented to minimize impacts to water quality and special status fish by minimizing or avoiding siltation and erosion of exposed soils. These practices consist of application of permanent and temporary construction treatments for controlling stormwater runoff and preventing discharges of excessively turbid water from the job site. The applicable BMPs include the following:

- No concrete washings or water from concrete would be allowed to flow into the streams. No concrete would be poured within flowing water in the streams.
- Construction disturbance would be restricted to the minimum necessary for completion of the project.
- Staging areas, storage areas and equipment parking would not occur within any watercourse bed, bank and channel.
- Measures would be taken to ensure no discharges from equipment operating in the ditches would get into the watercourse. Leaky equipment may be placed on pads underlain with plastic sheeting (Visqueen) that would absorb any fueling spillage or be a barrier for any spillage.
- Silt fences would be placed within the limits of construction to eliminate potential impacts to fisheries and other aquatic resources that potentially occur within these sensitive areas.
- Construction within this area would likely be scheduled during the dry season, typically between June 15 and October 15, to minimize the potential for erosion and sediment impacts. Bridge construction work may be year round.

Fish-friendly tide gates would be installed to improve habitat for salmonids and tidewater goby. Also, to enhance fish habitat, a rock weir would be installed downstream of the tide gates at Gannon Slough and twelve 18-inch diameter concrete piles would be removed from the estuarine waters of Jacoby Creek for the bridge replacement.

The replacement of some of the existing tide gates with fish-friendly tide gates is an additional measure Caltrans is employing to minimize effects to listed fish species. Tide gates would be replaced at low tide so there would be negligible effects to fish and water quality.

General avoidance and minimization measures as stated in the Biological Opinion from the USFWS and the Letter of Concurrence from NOAA Fisheries would be implemented as part of construction activities to minimize and avoid impacts to sensitive as well as common biological resources.

After measures to minimize harm are implemented, there would be no substantial, adverse impacts to any listed species.

3.3.6 Invasive Species

REGULATORY SETTING

On February 3, 1999, President Clinton signed Executive Order 13112 requiring federal agencies to combat the introduction or spread of invasive species in the United States. The order defines invasive species as “any species, including its seeds, eggs, spores, or other biological material capable of propagating that species, that is not native to that ecosystem whose introduction does or is likely to cause economic or environmental harm or harm to human health.” Federal Highway Administration guidance issued August 10, 1999 directs the use of the state’s noxious weed list to define the invasive plants that must be considered as part of the NEPA analysis for a proposed project.

AFFECTED ENVIRONMENT

A number of non-native plants occurring in the project area are considered invasive. These are species that are likely to displace native plants in native ecosystems. The invasiveness of species is rated by the California Invasive Plant Council (Cal-IPC). The California Native Plant Society (CNPS) also compiles an invasive weeds listing. Invasive plants found in the project area are listed in Table 3-34.

Table 3-34 Invasive Plant Species Observed within the BSA			
Scientific Name	**Common Name**	**Cal-IPC List[1]**	**CNPS List[2]**
Cotoneaster pannosus	cotoneaster	Moderate	B-list
Cirsium vulgare	bull thistle	Moderate	A-list
Conium maculatum	poison hemlock	Moderate	B-list
Cortaderia jubata	pampas grass	High	A-list
Digitalis purpurea	foxglove	Limited	B-list
Dipsacus fullonum	wild teasel	Moderate	B-list
Erica lusitanica	Spanish heath	Limited	A-list
Eucalyptus globulus	blue gum eucalyptus	Moderate	—
Foeniculum vulgare	fennel	High	B-list
Genista monspessulana	French broom	High	A-list
Hedera helix	English ivy	High	A-list
Hypericum perforatum	Klamath weed	Moderate	A-list
Lotus corniculatus	bird's-foot trefoil	Not listed	B-list
Phragmites australis	common reed	Inconclusive	A-list
Mentha pulegium	pennyroyal	Moderate	B-list
Pittosporum sp.	pittosporum	Not listed	B-list
Rubus armeniacus	Himalayan blackberry	High	A-list
Spartina densiflora	dense-flowered cordgrass	High	A-list
Vinca major	periwinkle	Moderate	B-list

[1]Cal-IPC listings. The Cal-IPC Invasive Plant Inventory categorizes plants as High, Moderate, or Limited, reflecting the level of each species' negative ecological impact in California. The meaning of these overall ratings is described below. In addition to the overall ratings, specific combinations of section scores that indicate significant potential for invading new ecosystems triggers an Alert designation so that land managers may watch for range expansions.

The California Invasive Plant Inventory is intended to be updated annually to reflect new information submitted to Cal-IPC. In February 2007, the Inventory Review Committee met to review submissions received between February 2006 and January 2007. Ratings were not changed for any species listed in the 2006 Inventory, but minor revisions were made to four listed species, seven species were added to the Inventory, and two were evaluated but not listed.

Overall Cal-IPC rating of High, Moderate or Limited based on evaluation using the 13-criteria system:

- High – These species have severe ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal and establishment. Most are widely distributed ecologically.

- Moderate – These species have substantial and apparent—but generally not severe—ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal, though establishment is generally dependent upon ecological disturbance. Ecological amplitude and distribution may range from limited to widespread.

- Limited – These species are invasive but their ecological impacts are minor on a statewide level or there was not enough information to justify a higher score. Their reproductive biology and other attributes result in low to moderate rates of invasiveness. Ecological amplitude and distribution are generally limited, but these species may be locally persistent and problematic.

- Evaluated but not listed or inconclusive– in general, this designation is for species for which information is currently inadequate to respond with certainty to the minimum number of criteria questions (i.e., too many "U" responses), or for which the sum effects of Ecological Impacts, Invasive Potential, and Ecological Amplitude and Distribution fall below the threshold for ranking (i.e., the overall score falls below Limited). Many such species are widespread, but are not known to have substantial ecological impacts (though such evidence may appear in the future). All species receiving a D score for Ecological Impacts, regardless of other section scores, are by default placed into this category.

[2]CNPS considers some non-native plants "invasive weeds" if they are able to reproduce in the wild, spread rapidly, and cause the decline or loss of our native plants. A local publication regarding invasive weeds of Humboldt County was sponsored by many agencies and non-profit organizations, the outcome of which was a list of invasive plant species that is similar to the Cal-IPC list (North Coast Chapter CNPS, 2000). This publication is hosted electronically on the North Coast CNPS website, so it is hereafter referred to as the CNPS listing. The criteria for CNPS listing is based on the following categories. The "A-list" plants are those that have proven most harmful, and which are the target of most eradication efforts. The "B-list" consists of species which have not yet and may never have quite the magnitude of impact of A-list species, but are or have the potential to become a major problem.

Most of the commonly occurring plants are non-natives such as perennial sweet pea (*Lathyrus latifolius*), hairy vetch (*Vicia villosa*), hairy cat's-ear (*Hypochaeris radicata*), bur-clover (*Medicago polymorpha*), wild oats (*Avena spp.*), tall fescue (*Festuca arundinacea*), chicory (*Cichorium intybus*), and bromes (*Bromus diandrus* and *B. hordeaceus*).

Himalayan blackberry was found widely distributed on the project site and is listed as a California Exotic Pest Plant Council (Cal-EPPC) List A invasive weed. The A-List comprises weed species that have been documented as aggressive invaders—displacing natives and disrupting natural habitats. Caltrans has determined that it would be impracticable to attempt to eradicate Himalayan blackberry at this site, as the species is widespread in the project area and birds commonly use the roadside shrubs (and spread seed). Small, scattered occurrences of additional A- List species such as bull thistle (*Cirsium vulgare*), pampas grass (*Cortaderia jubata*), English ivy (*Hedera helix*), Spanish heath (*Erica lusitanica*), and dense-flowered cordgrass (*Spartina densiflora*) can be found in the project area.

The Roadside Management Unit of Caltrans Maintenance Division has been actively controlling invasive plants within the Route 101 right-of-way in the Eureka Arcata Corridor. Most of the effort has focused on pampas grass which involves digging up new growth annually. This has been ongoing for a number of years with labor provided by California Conservation Corps and inmate crews. Over 1,000 hours of labor annually is provided by California Conservation Corps and inmate crews to control invasive exotic plants in the Eureka Arcata Corridor area.

There is a localized population of common reed (*Phragmites australis*), a CNPS invasive A-list plant within the Caltrans right-of-way on the east side of Route 101, adjacent to Resale Lumber Products (4056 N. Hwy 101) near Bracut. Caltrans is working with the Humboldt County Weed Management Area to control this common reed population. (This work is not included as part of the overall Eureka-Arcata Corridor Improvement project). The plants would be cut off to soil level, and then a heavy black tarp placed over the infestation for the summer (six months). This is intended to kill the plants by denying them access to sunlight.

B-List species including periwinkle (*Vinca major*), poison hemlock (*Conium maculatum*), foxglove (*Digitalis purpurea*), fennel (*Foeniculum vulgare*), teasel (*Dipsacus fullonum*), pennyroyal (*Mentha pulegium*), cotoneaster (*Cotoneaster* sp.) and bird's-foot trefoil (*Lotus corniculatus*) can be found throughout the project area. CNPS B-List comprises invasive pest plants that spread less rapidly and cause a lesser degree of habitat disruption (v. A-List). It would not be practical to attempt to eradicate these plants in the BSA as the species are widespread within and around the project area and would quickly reestablish.

ENVIRONMENTAL CONSEQUENCES

The proposed project includes ground-disturbing activities that could potentially increase the spread of various invasive plant species. None of the species on the Cal-IPC and CNPS lists of invasive weeds are currently used by Caltrans for erosion control or landscaping.

AVOIDANCE, MINIMIZATION, AND/OR MITIGATION MEASURES

To reduce the spread of invasive non-native plant species, Caltrans may implement the protection measures in compliance with Executive Order (EO) 13112, to the greatest degree possible, as described below. The following avoidance and minimization measures would be implemented:

- All equipment used for off-road construction activities would be weed-free prior to entering the project.
- Any seed mixes or other vegetative material used for revegetation of disturbed sites, would consist of non-persistent cereal grain, California native seed mix or locally adapted native plant materials to the extent practicable.
- Prior to in-water work, any equipment (including boots/waders) and construction equipment shall be properly disinfected or cleaned according to guidance provided by the State of California Aquatic Invasive Species Management Plan (CDFG 2008; U.S. Bureau of Reclamation 2012) to prevent the spread of aquatic invasive species.
- Excess excavated soil and plant materials would be disposed of at an upland location where it would not wash into any watercourse. Disposal would be in compliance with all county and local regulations.
- Caltrans would not allow disposal of soil and plant materials from any areas that support invasive species to areas that support stands dominated by native vegetation.
- Plant species used for erosion control would consist of native, non-invasive species or non-persistent hybrids that would prevent invasive species from colonizing.
- Gravel and/or fill material to be placed in relatively weed-free areas would come from weed-free sources.

- Resident Engineers would be educated on weed identification and the importance of controlling and preventing the spread of identified invasive non-native species.

- The Project Revegetation Plan would address and implement an invasive weed plan which would target identified invasive species on the California Department of Food and Agriculture or the Cal-IPC list. Herbicides would not be used since Caltrans does not use herbicides in most of Humboldt County.

After measures to minimize harm are implemented, the proposed project would not introduce or spread invasive species. (For more information about eucalyptus tree removal and replanting trees, see Chapter 3, Section 3.1.7 Visual / Aesthetics.)

3.4 Relationship Between Local Short-Term Uses of the Human Environment and the Maintenance and Enhancement of Long-Term Productivity

Project implementation of any one of the Build Alternatives would result in attainment of short-term and long-term benefits at the expense of short and long-term social, aesthetic, biological, air, energy, water quality, and noise effects.

Any one of the Build Alternatives would result in short-term (approximately three years or less) adverse effects during project construction, including:

- Increase in noise levels from construction activities—see Chapter 3, Section 3.2.7 for more information;

- Removal of up to 4 to 83 mature trees (depending on the Alternative) on both sides of Route 101 for bridge and grade separation construction, acceleration and deceleration lanes, and maintaining a clear recovery zone for errant vehicles—see Chapter 3, Section 3.1.7 for more information;

- Traffic delays and detours from construction activities—see Chapter 3, Section 3.1.6 for more information;

- Energy and construction materials consumed—see Chapter 3, Section 3.2.8 for more information;

- Increase in dust, air pollution from construction activities—see Chapter 3, Section 3.2.6 for more information;

- Temporary wetland disturbance—see Chapter 3, Section 3.3.2 for more information;

- Potential for temporary interruption of utilities and emergency vehicle response during construction activities—see Chapter 3, Section 3.1.5 for more information;

- Temporary water quality degradation—see Chapter 3, Section 3.2.2 for more information.

Short-term benefits would include increased jobs and revenue generated during construction for any one of the Build Alternatives.

Long-term project adverse effects from construction of any one of the Build Alternatives would include:

- Economic losses experienced by businesses affected by access restrictions—see Chapter 3, Section 3.1.1 for more information;

- Environmental Justice impacts experienced by low-income residents along the Route 101 corridor affected by access restrictions—see Chapter 3, Section 3.1.4 for more information;

- Visual impacts from loss of open space and trees: Alternatives 2, 3, and Modified Alternative 3A include constructing a new grade separation at Indianola Cutoff—see Chapter 3, Section 3.1.7 for more information;

- Noise increases resulting from higher traffic speeds—see Chapter 3, Section 3.2.7 for more information;

- Fuel consumption beyond the No-Build condition resulting from out-of-direction travel —see Chapter 3, Section 3.2.8 for more information;

- The removal of up to 83 mature trees (depending on the Alternative)—see Chapter 3, Section 3.1.7 for more information;

- Wetland Impacts as shown in Table 3-29.

Long-term gains derived from construction of any one of the Build Alternatives would include:

- Enhanced traffic safety and improved level of service at intersections resulting from the project would benefit businesses and residents within the corridor—see Chapter 3, Section 3.1.6 for more information;

- Improvement of the transportation network of the region and the project vicinity—see Chapter 3, Section 3.1.6 for more information;

- Wetland enhancement—see Chapter 3, Section 3.3.2 for more information;

- Tree/shrub planting—see Chapter 3, Section 3.1.7 for more information;

- Aesthetic design features for the proposed grade separation and bridge improvements—see Chapter 3, Section 3.1.7 for more information.

Overall, this project is based on local, regional, and state comprehensive transportation planning that considers the need for present and future traffic safety enhancement and long-term roadway maintenance for a critical transportation corridor. In such a situation, local short-term effects and use of resources to construct the proposed project are consistent with the maintenance and enhancement of long-term productivity for the region. This translates into increased long-term productivity of the transportation system on a local and regional level, with improved movement of people, goods, and services.

The No-Build Alternative would provide none of the gains or have the losses listed above. However, the No-Build Alternative would not meet the project need and purpose of enhancing safety, improving long-term traffic level of service, and enhancing long-term roadway maintenance of the Route 101 corridor. In addition, based on Route 101 traffic trends between Eureka and Arcata, both vehicle speeds and volumes on Route 101 are predicted to increase. Consequently, in the foreseeable future, deteriorating highway conditions would likely necessitate closing one or more Route 101 median openings to maintain safety and minimize collisions. One or more median closures would restrict access to businesses and residences and result in out-of-direction travel, increased energy consumption, travel delay, and the LOS on Old Arcata Road could substantially degrade.

3.5 Irreversible and Irretrievable Commitments of Resources That Would Be Involved In the Proposed Action

Implementation of the proposed project involves a commitment of a range of natural, physical, human, and fiscal resources. Land used in the construction of the proposed facility is considered an irreversible commitment during the time period that the land is used for highway improvements. However, if a greater need arises for use of the land, or if the highway facility is no longer needed, the land could be converted to another use. At present, there is no reason to believe such a conversion would ever be necessary or desirable.

Considerable amounts of fossil fuels, labor, and highway construction materials such as cement, aggregate, and bituminous material would be expended. Additionally, large amounts of labor and natural resources would be used in the making of construction materials. These materials are generally not retrievable. However, they are not in short supply and their use would not have an adverse effect upon continued availability of these resources. Any construction would also require a substantial one-time expenditure of both state and federal funds, which are not retrievable; savings in energy, time, and a reduction in collisions would offset this. In addition to the costs of construction, there would be costs for roadway maintenance including pavement, roadside, litter/sweeping, signs and markers, electrical and storm maintenance.

The commitment of these resources is based on the concept that residents and businesses in the immediate area, region, and state would benefit from the improved quality of the transportation system. These benefits would consist of improved accessibility and safety, which are expected to outweigh the commitment of these resources.

3.6 Cumulative Impacts

Regulatory Setting

Cumulative impacts are those that result from past, present, and reasonably foreseeable future projects, combined with the potential impacts of this project. A cumulative effect assessment looks at the collective impacts posed by individual land use plans and projects. Cumulative impacts can result from individually minor, but collectively substantial impacts taking place over a period of time.

Section 15355 of the CEQA Guidelines states: *"Cumulative impacts" refers to two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts.*

> *(a) The individual effects may be changes resulting from a single project or a number of separate projects.*
>
> *(b) The cumulative impact from several projects is the change in the environment which results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable probable future projects. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time.*

A cumulative impact is defined in the NEPA Regulations as *"the impact on the environment which results from the incremental impact of the project when added to other past, present, and reasonably foreseeable future projects regardless of what agency (federal or non-federal) or person undertakes such other projects. Cumulative impacts can result from individually minor, yet collectively significant, projects taking place over a period of time."* (40 CFR, Section 1508.7 of the CEQ Regulations)

Cumulative impacts to resources in the project area may result from residential, commercial, industrial, and highway development, as well as agricultural development and the conversion to more intensive types of agricultural cultivation. These land use activities can degrade habitat and species diversity through consequences such as displacement and fragmentation of habitats and populations, alteration of hydrology, contamination, erosion, sedimentation, disruption of migration corridors, changes in water quality, and introduction or promotion of predators. They can also contribute to potential community impacts identified for the project, such as changes in community character, traffic patterns, housing availability, and employment.

Environmental setting, consequences, and mitigation

Depending on the project alternative, impacts to resources (such as wetlands) may vary in degrees ranging from none to a significant impact. This section will first list and describe resources that do not need a cumulative impact analysis and why, followed by resources requiring a cumulative impact analysis.

Resources not requiring cumulative impact analysis

If a project will not cause direct or indirect impacts on a resource, it will generally not contribute to a cumulative impact on that resource; therefore will not require cumulative impact analysis. The following is a list of resources not requiring cumulative impact analysis because (1) they would not be substantially impacted by the project or (2) these resources are not at risk or in decline.

Residences and Businesses. Alternative 1 would adversely affect both businesses and residents within the Eureka-Arcata Route 101 corridor since it would restrict access without constructing other access improvements. In Modified Alternative 3A, the Preferred Alternative identified in this document, both businesses and residences within the project limits and outside the project limits would have a net gain in traffic safety enhancement and benefit from various roadway improvements. However, none of the Build Alternatives would remove any residences or businesses and all residences and businesses would have safer access. Therefore, the proposed project would not have a cumulative impact on residences and businesses.

Traffic and Transportation. The results of a comprehensive traffic and transportation study for all travel modes are summarized in Chapter 3, Section 3.1.6—Traffic and Transportation. The traffic study used data from 20 year projections which encompasses predicted future development and trends. Alternative 1 would result in substantial out-of-direction travel for all travel modes within the Eureka-Arcata Route 101 corridor since it would restrict access without constructing other access improvements. Modified Alternative 3A, the Preferred Alternative identified in this document, would improve highway safety and traffic operations as well as extend the roadway life for all travel modes. Overall, none of the Build Alternatives would expand the transportation system or completely restrict access. However, all Build Alternatives would improve traffic safety for all travel modes. Therefore, the proposed project would not have a cumulative impact on traffic and transportation. For a discussion of the proposed project in terms of climate change, greenhouse gas emissions, and sea level rise, please refer to Chapter 4.

Visual Resources. All Build Alternatives were determined to have varying adverse visual effects requiring measures to minimize harm. As documented in Section 3.1.7 Visual and Aesthetics, Alternatives 2, 3, and Modified Alternative 3A include a new grade separation at Indianola Cutoff that would result in an adverse effect since the grade separation would obscure views of the bay, primarily from the immediate Indianola Cutoff area. The existing area adjacent to the proposed grade separation already lacks a high degree of visual intactness and unity because this area is developed. The proposed grade separation was designed to have a low profile and not be highly visible or obtrusive from vantage points around Humboldt Bay. The trees removed during construction would be replaced. There are no other adverse visual effects.

Further development within the Humboldt Bay viewshed is constrained by existing zoning for wildlife refuges, agriculture, and open space/natural resources. Consequently, incremental visual effects from other development would not incrementally add to the proposed project's visual impacts. After these measures are implemented, the visual effect would not be substantial, either individually or cumulatively.

Cultural resources. Only Alternative 3 could potentially affect a cultural resource. However, the State Historic Preservation Office concurred with Caltrans and FHWA that a Finding of No Adverse Effect with Standard Conditions is appropriate for the proposed undertaking according to Section 106 PA Stipulation X.B(2) and 36 CFR 800.5(b). Therefore, the proposed project would not have a cumulative impact on cultural resources.

Floodplain. As previously discussed, the proposed Build Alternatives were determined to have either no impact or a negligible impact to the 100 year floodplain. The existing development within the Route 101 corridor between Eureka and Arcata is confined to areas zoned for commercial, residential, and manufacturing/industrial. Further development within the floodplain would be constrained by existing zoning for wildlife refuges, agriculture, and open space/natural resources. Therefore, the proposed project would not have a cumulative impact on the floodplain. For a discussion of this project relating to anticipated sea level rise resulting from climate change, please refer to Chapter 4 of this document.

Water Quality. As previously discussed, the proposed Build Alternatives were determined to have minor effects to water quality during and after construction—after measures to minimize harm are implemented. Further development adjacent to sensitive receiving waters and drainages would be constrained by existing zoning for wildlife refuges, agriculture, and open space/natural resources. Therefore, the proposed project would not have a cumulative impact on water quality.

Hazardous Waste, Soils. Construction of any one of the proposed Build Alternatives would not result in the release or disturbance of hazardous substances and would therefore not contribute to cumulative impacts. Regarding aerially deposited lead in soil excavated during project construction, the project would not have a cumulative impact since the excavated soil would be reused in full compliance with California Department of Toxic Substances Control (DTSC) agreement or would be disposed of at an approved disposal facility. Therefore, the proposed project would not result in a hazardous waste-related cumulative impact.

Air Quality: As discussed in earlier in this chapter, the proposed project would result in regional emissions of ozone precursors (nitrogen oxides and reactive organic gases), carbon monoxide, and inhalable particulate matter (PM_{10} and $PM_{2.5}$) that could have a potential cumulative effect with other pollutant sources in the area. However, these emissions are addressed and accounted for in the regional analysis that was performed for the proposed project's inclusion in the Regional Transportation Plan (RTP) for Humboldt County. This RTP was found to conform to the State Implementation Plan (SIP). SIPs are comprehensive plans that describe how an area will attain national ambient air quality standards (NAAQS) in compliance with the federal Clean Air Act. Consequently, the proposed project would not result in adverse cumulative air quality impacts. For a discussion of this project in terms of climate change and greenhouse gas emissions, please refer to Chapter 4.

Noise and Sensitive Receptors. The results of a comprehensive noise study found that the proposed project would have a minor effect to one residential area adjacent to Route 101 that would not require mitigation. The noise study used data from 20-year projections which encompass predicted future development and trends. The land around the residential areas is either already developed or is for wildlife refuges, agriculture, and open space/natural resources. Construction noise and post-construction noise were evaluated and determined not to affect wildlife. There are no other sensitive noise receptors within the project limits. Overall, the proposed project would not have a noise-related cumulative impact.

Energy. The results of an energy study found that the proposed project would have a minor or negligible effect to energy consumption. The energy study used data from 20-year projections which encompass predicted future development and trends. Alternative 1 is the only exception to this finding since Alternative 1 would restrict access, resulting in out-of-direction travel and additional consumption of energy. However, Alternative 1 was not identified as the Preferred Alternative. For a discussion of this project in relation to climate change and greenhouse gas emissions, please refer to Chapter 4. Therefore, the proposed project would not result in an energy-related cumulative impact.

Sensitive Plant Species. The southbound Jacoby Creek bridge replacement work would have minor temporary and permanent impacts of approximately 2,500 square feet of Lyngbye's sedge along Jacoby Creek. However, coordination with CDFW has determined that impacts to this species due to bridge replacement would not be substantial if appropriate minimization measures are implemented. The disturbed sedge is expected to fully recover within a few seasons.

In addition to this List 2B.2 species, the only other sensitive plant species within the project biological study area are the Humboldt Bay owl's-clover (List 1B.2), western sand-spurrey (List 2B.1), and seacoast angelica (List 4.2). However, impacts to these plants would be avoided. Therefore, the proposed project would not have a cumulative impact on sensitive plant species.

Impacts to rare plants would be negligible and of short duration. Avoidance and minimization measures would be implemented where feasible.

Sensitive/Listed Fish Species. Since steelhead (*Oncorhynchus mykiss*), coho salmon (*Oncorhynchus kisutch*), Chinook salmon (*Oncorhynchus tshawytscha*), and green sturgeon (*Acipenser medirostris*) occur within the project vicinity, formal Section 7 Federal Endangered Species Act Consultation with NOAA - Fisheries was initiated. The coastal cutthroat trout (*Oncorhynchus clarkii clarkii*), a California Department of Fish and Wildlife Species of Special Concern, is also present within the construction area. The proposed project would avoid or have minor adverse impacts to critical habitat and essential fish habitat. On the other hand, the tidewater goby, which is also a federally listed species, requires a cumulative impact analysis, which follows this subsection.

Other Biological Resources: The proposed project would avoid or have potentially minor effects to other biological resources such as wildlife, wildlife corridors, native vegetation, and migratory birds, except as documented in the next section on resources requiring cumulative impact analysis. All Build Alternatives would involve modifying or expanding the existing Route 101 roadway almost entirely within the existing State highway right-of-way. Consequently, any new construction would expand into the existing roadway median and unpaved shoulders and avoid pristine habitat, except at watercourses. (For more information, see Chapter 3, Section 3.3—Biological Environment.)

Resources requiring cumulative impact analysis

Cumulative impacts are impacts from the proposed project in combination with past projects and future state, local, or private actions that are reasonably certain to occur in a specified geographic boundary. The tidewater goby and wetlands are resources that require cumulative impact analysis since the project has the potential to adversely affect these resources and these resources are potentially at risk or in decline.

Tidewater Goby Cumulative Impact Analysis

Tidewater Goby Background and Introduction

The proposed project includes construction activities in Gannon Slough and the replacement of the southbound Jacoby Creek bridge which may adversely impact the tidewater goby. Formal Section 7 Federal Endangered Species Act consultation with the U.S. Fish and Wildlife Service (USFWS) was initiated for effects to the tidewater goby, which is listed as endangered. A Biological Opinion (BO) from the USFWS was issued on November 22, 2010, which included measures to avoid and minimize harm to the tidewater goby during construction. The BO concludes that the proposed project is not likely to jeopardize the continued existence of the goby and is not likely to destroy or adversely modify critical habitat. The USFWS BO is in Appendix I.

For more information regarding the Endangered Species consultation, refer to Chapter 3, Section 3.3.5 Threatened and Endangered Species.

The tidewater goby (*Eucyclogobius newberryi*) is a benthic (bottom dwelling) species that inhabits shallow lagoons and the lower reaches of coastal streams where the water is brackish (salinities usually <10 parts per thousand) to fresh, and slow-moving or fairly still (Miller and Lea 1972; Moyle 1976; Swift 1980; Wang 1982; Irwin and Soltz 1984). The presence of backwater, marshy habitats where they can avoid winter flood flows is particularly important for the goby’s persistence in lagoons. It differs from other species of gobies in California in that it is able to complete its entire, predominately annual, life cycle in fresh or brackish water (Wang 1982; Irwin and Soltz 1984; Swift et al. 1989). The tidewater goby is endemic to California and is distributed in brackish-water habitats along the California coast from San Diego County to Del Norte County (Swift 1980; Swift et al. 1989).

Tidewater Goby Resource Study Area

For the purpose of the cumulative impact analysis for this project, the tidewater goby resource study area (RSA) boundary is defined to encompass the Arcata Bay (northern part of Humboldt Bay) and its tributaries within the Coastal Zone (see Figure 3-27). Southern Humboldt Bay (south of Eureka) is naturally separated both hydrologically and geographically from Arcata Bay (Northern Humboldt Bay) by a narrow channel. The tidewater goby has habitat ranges restricted by low mobility and a short life cycle that limit the distribution of their populations. This RSA boundary of the Arcata Bay was set because the tidewater goby is a non-migrating fish species restricted to shallow, brackish habitat. Localized, distinct tidewater goby populations have established within the RSA. Other projects outside the RSA would not likely affect tidewater goby populations within the Arcata Bay RSA. The RSA includes both the entire area of project construction as well as areas beyond that are within the tidal reaches of Arcata Bay.

Tidewater Goby Current Health and Historical Context

Tidewater gobies inhabit estuaries and lagoons of coastal creeks with low salinity. The loss or degradation of coastal salt marsh and coastal lagoon habitat from coastal development projects is currently the major factor affecting tidewater goby populations. Tidewater goby populations have experienced declines in their estuarine habitat due primarily to human land use practices (agriculture, logging, road building). Individual tidewater goby populations have a high potential for extinction because the populations are relatively small and isolated and most estuaries or lagoons are affected by human activity. Population extinctions can occur rapidly, given the goby's short lifecycle and specialized habitat requirements.

Tidewater goby spawning and rearing habitat was historically abundant in the Humboldt Bay watershed, but the habitat has been degraded by land use practices, such as the diking of tidally influenced areas to create pastures. There are several ongoing restoration efforts in estuaries, but the overall quality of the habitat is poor compared to historical levels. This species is documented by the USFWS from a number of known locations within the project area, including the mouth of Jacoby Creek, Gannon Slough, and 101 Slough, which is parallel and east of the Route 101 roadway (USFWS 2006). In Gannon Slough, tidewater gobies have been documented inland of the project area in less saline waters.

The USFWS placed the gobies on the Federal Endangered Species list in 1994. Since 1900, the tidewater goby had disappeared from nearly half of coastal lagoon and estuary habitat. Coastal development resulting in loss of suitable habitat was named as the primary factor in the decline of the population. For recovery of the tidewater goby, the USFWS prepared a recovery plan that included:

- Protecting and enhancing tidewater goby current habitat;
- Preventing further losses of tidewater goby habitat and reducing or stabilizing exotic fish species that either feed on or compete with the tidewater goby;
- Conducting research to integrate land use practices;
- Evaluating the possibility of relocating tidewater gobies to establish new populations.

(Source: USFWS, 2005)

On January 31, 2008 the USFWS published a final rule re-designating critical habitat to include additional sites throughout the species' range. Humboldt Bay estuaries, including the 101 Slough, Jacoby Creek, and Gannon Slough, are now included in the revised critical habitat. The recently designated Unit HUM-3 Critical Habitat consists of a complex of interconnected estuary channels and human-made structures including levees, tide gates, culverts and other water control structures along the eastern edge of Humboldt Bay. These channels mimic, on a much-reduced scale, habitats largely lost through past management practices. Many of these channels and marshes are themselves the result of changes to historic, native habitats and depend on specific, yet generally undocumented, management activities for their continued function. Some management activities may mimic, to some degree, the dynamic variability of these habitats. Surrounding the bay itself is a generally broad bench historically dominated by mudflats, tidal marshes, estuarine channels, and brackish marshes. Substantial portions of those habitats were converted to agricultural, urban, and industrial uses in recent history, resulting in the loss of as much as 10,000 acres of potentially suitable habitat.

Critical habitat is composed of primary constituent elements (PCEs), which include those physical and biological features essential to the conservation of a listed species. For tidewater goby, PCEs include (1) persistent, shallow (4 inches to 6 feet deep), still-to-slow-moving brackish water, most commonly ranging in salinity from 0.5 to 12 parts-per-thousand (ppt) or more, (2) substrates (sand, silt and mud) suitable for construction of burrows for reproduction, (3) submerged and emergent aquatic vegetation, and (4) presence of a sandbar or other barrier across the mouth of the lagoon or estuary (especially during late spring, summer, or fall) that closes the channel and provides stable water level and salinity during the majority of the breeding season. Critical habitat units proposed in the project area include all of these PCEs; tide gates and other structures function as the controls stabilizing water levels and salinities in PCE-4.

Portions of the proposed Eureka-Arcata Corridor project include estuarine channels that are critical habitat, including the 101 Slough, Jacoby Creek, and Gannon Slough. Tide gate replacement at the outlet of the 101 Slough could affect critical habitat there. Additionally, Gannon Slough contains critical habitat that may be affected by alterations of hydrology that could result from proposed replacement of the tide gates within the Caltrans right-of-way.

The replacement of the southbound Jacoby Creek bridge would require some in-water work to remove old bridge southbound bridge piers.

Currently, most of the undeveloped land that coincides with Arcata Bay sloughs and wetlands are protected from further development by zoning and California Coastal Act policies. In addition, much of the area adjacent to Arcata Bay is within existing wildlife refuge areas. The tidewater goby habitat has also been improved within the overall Humboldt Bay watershed by implementation of the U.S. Clean Water Act policies, current timber production practices that reduce erosion, as well as current agricultural practices.

Project Impacts That Might Contribute To a Cumulative Impact

This project would require work that would affect the 101 Slough, Jacoby Creek (bridge pier removal) and Gannon Slough, which are all fish-bearing watercourses that flow into Arcata Bay. The work would also involve placement of a rock weir in the Gannon Slough channel (to enhance fish habitat). Tide gate replacement includes work within the 101 Slough, Gannon Slough, Old Jacoby Creek, and three unnamed ditches. The proposed southbound Jacoby Creek bridge would be a single span (no piers in the channel) structure. The bridge piles would be installed on the bank adjacent to the channel and would be placed by vibratory, oscillation, or rotation driving. No impact pile driving would be used; therefore, no sound pressure levels harmful to fish would be generated. There would be temporary disturbance to the drainages and riparian vegetation, as well as a minor short-term decrease in water quality, due to workers walking in the channel to install and then remove debris containment systems (for pier removal). Because the new bridge would be wider, increased shading from the replaced bridge would result in a permanent (minor) adverse effect. There would be no net loss of goby habitat from the proposed project.

The proposed project as described may affect, and is likely to adversely affect the tidewater goby and critical habitat. Minimization and avoidance measures are proposed to reduce the effect of potential impacts. The installation of fish-friendly tide gates would improve habitat for tidewater goby and salmonids. In addition, the proposed project would include placement of rock at the outlets of the Gannon Slough tide gates as an enhancement to fish habitat. The proposed tide gates and subsequent habitat enhancement would likely compliment future wetland and estuary restoration activities unrelated to this project (see next subsection for unrelated projects). After construction, disturbed areas would be revegetated and restored; consequently, the tidewater goby habitat is expected to fully recover.

Because project impacts are minor, localized or short term, after implementation of mitigation measures, the proposed project is not expected to result in, or contribute to, substantial indirect or cumulative impact on tidewater goby habitat in the resource study area.

Planned and Recently Constructed Projects Within the RSA

The following is a list of planned and recently constructed projects within the RSA:

Restoration projects in the Jacoby [Creek] Subbasin of the Humboldt Bay Basin. The Coastal Watershed Planning and Assessment Program (CWPAP) is a Department of Fish and Wildlife (CDFW) program conducting fishery-based watershed assessments along the length of the California coast. The CWPAP website describes 44 Jacoby Creek restoration projects in various stages. Many of the projects involve restoring tidal habitat to former tide lands, improving fish passage, riparian vegetation planting, and acquiring land for preservation and future restoration/enhancement. These projects collectively could enhance tidewater goby habitat.

McDaniel Slough Wetland Enhancement Project. This project restores over 250 acres of former tidelands between Humboldt Bay and Samoa Boulevard. This project would enhance tidewater goby habitat and has been completed.

Humboldt Bay Trail North and South. The Humboldt Bay Trail is being developed as a collaborative effort between the Humboldt County Association of Governments, County of Humboldt, City of Arcata, and City of Eureka. The current focus is on developing a continuous non-motor vehicle trail from central Arcata to south Eureka over the next several years for a total length of 13 miles. The trail would be situated within the U.S. Highway 101 and railroad transportation corridors. The County was allocated funds through the State Transportation Improvement Program to complete preliminary engineering, environmental studies, and permitting and to develop engineering plans and specifications for the Bay Trail South segment, which will connect V Street in Eureka to the Bracut area. This work has been initiated and is expected to require two to three years to address the various challenges and constraints. The State Coastal Conservancy has funded the initial planning for the Bay Trail North segment, which will connect the Bracut area to the Arcata Skate Park in Arcata. This project is now ready for construction and the City of Arcata, along with project partners, is actively seeking construction funding.

The County of Humboldt is proposing a non-motor vehicle trail connecting V Street in Eureka to the Bracut area.

In addition, Caltrans is proposing an off-site wetland mitigation project (for the Eureka-Arcata Route 101 Corridor Improvement Project) within the Arcata Bay watershed, which would also enhance wildlife and wetland value.

All of the above mentioned projects could have temporary water quality effects during construction, but would not coincide in terms of construction with the proposed project. Ultimately, these projects are expected to have no post-construction impacts to tidewater gobies and some would enhance tidewater goby habitat after construction.

If construction activities related to these projects occurred in the same time frame and within the same watercourse as the Eureka-Arcata Route 101 Corridor Improvement Project, cumulative impacts would be possible. However, because impacts associated with the project are minor, localized and short term, the proposed project is not expected to result in substantial indirect or cumulative impact, individually or collectively, on tidewater goby habitat within the RSA.

Tidewater Goby Cumulative Impact Analysis Conclusion

Based on previous discussion, there would be no substantial cumulative impacts expected, therefore mitigation for cumulative impacts would not be required. However, fish-friendly tide gates and the City of Arcata-sponsored enhancement and restoration projects would improve tidewater goby habitat. In addition, Caltrans is proposing a tidal restoration project adjacent to the Mad River Slough that would create tidewater goby habitat. USFWS will continue to have regulatory authority over the resource and will recommend actions those agencies could take to influence the sustainability of the resource.

In accordance with NEPA regulations, the analysis determined there would be no anticipated cumulative impacts on tidewater goby habitat resulting from incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. There would be no substantial cumulative impacts resulting from individually minor, yet collectively significant, actions taking place over a period of time.

In accordance with Section 15355 of the CEQA Guidelines, the cumulative analysis determined the following for the tidewater goby fish species and the proposed project:

a. The individual effects resulting from the proposed project or a number of separate projects within the RSA were not found to be substantially cumulative.

b. There would be no anticipated cumulative impacts that could result from individually minor, but collectively significant projects taking place over a period of time.

Wetland Cumulative Impact Analysis

Wetland Background and Introduction

The proposed project includes roadway related construction activities that would result in both temporary and permanent wetland impacts. This section discusses the potential cumulative wetland impacts from the proposed project in combination with past projects and future state, local, or private actions that are reasonably certain to occur in a specified geographic boundary. Section 3.3.2 Wetlands and Other Waters of the U.S. in this chapter includes detailed explanations of the applicable regulations, individual project direct and indirect impacts, wetland functions/values, and proposed mitigation for wetland impacts.

Wetland Resource Study Area

For the purpose of the cumulative impact analysis for this project, the wetland resource study area (RSA) boundary is defined by the Arcata Bay (northern part of Humboldt Bay) watershed and the Coastal Zone (see Figure 3-27). Southern Humboldt Bay (south of Eureka) is naturally separated both hydrologically and geographically from Arcata Bay (Northern Humboldt Bay) by a narrow channel. This RSA boundary was set based on similar wetland types that are predominant within the RSA. Other projects outside the RSA that impact wetland would not likely affect the wetland within the RSA because the hydrologic source(s) originate from a different watershed. The RSA includes the entire area of project construction as well as the proposed project mitigation sites.

Wetland Current Health and Historical Context

The function and value of wetland within the RSA has steadily declined primarily because of human land use practices, including logging and road building. Substantial portions of Arcata Bay tidal areas were converted to agricultural, urban, and industrial uses in recent history by diking of tidally-influenced areas. Since the mid 1800s, wetland habitats surrounding Arcata Bay have been lost and substantially altered. The conversion of wetlands to pastureland was accelerated by construction of the Northwestern Pacific Railroad in 1901 and subsequent placement of tide gates, which further restricted tidal influence over adjacent lands. The low-lying areas became seasonally saturated freshwater marshes or agricultural wetlands dominated by exotic pasture grasses. Surrounding the bay itself is a generally broad bench historically dominated by mudflats, tidal marshes, estuarine channels, and brackish marshes. Currently only 5 to 10 percent of the historic salt marsh exists around Humboldt Bay. *(Source: Barnhart et al., 1992)*

The remaining existing Arcata Bay wetlands and estuaries, including the 101 Slough (a slough parallel and east of the Route 101 roadway), Jacoby Creek, and Gannon Slough, consist of a complex of interconnected estuary channels and human-made structures—including levees, tide gates, culverts and other water control structures along the eastern edge of Arcata Bay.

These channels mimic, on a much-reduced scale, habitats largely lost through past management practices. Much of the remaining wetland habitat is fragmented by development such as railroad beds and roadway embankments. See Appendix A for wetland mapping within the project area.

Wetland habitats present in the RSA include Estuarine Subtidal Unconsolidated Bottom Deepwater Habitat, Estuarine Intertidal Wetlands and Palustrine Emergent Wetlands (defined below). These natural communities are considered sensitive since they have declined in coastal areas and provide important habitat for wildlife and sensitive plants and animals.

Estuarine Subtidal Unconsolidated Bottom Deepwater Habitat. This habitat occurs at continually inundated channels. Within the RSA, portions of the 101 Slough, Jacoby Creek, Gannon Slough, Old Jacoby Creek, and Brainard Slough are Estuarine Subtidal deepwater habitats.

Estuarine Intertidal Unconsolidated Shore Wetland. This habitat occurs in areas subject to tidal influence that are typically exposed at low tide. Within the RSA, portions of the median between Gannon Slough and Jacoby Creek, the banks of Jacoby Creek, Old Jacoby Creek, Gannon Slough, Brainard Slough, and the southern portion of 101 Slough are Estuarine Intertidal wetlands.

Palustrine Emergent Wetland. These are all other intermittently or continually flooded wetlands along the Route 101 shoulders and in the median, including the 101 Slough north of Mid-City Motor World, the Jacobs Avenue ditch, the California Redwood Company Ditch, and the ditches in and around the Route 101/255 interchange.

Currently, most of the undeveloped land that coincides with Arcata Bay sloughs and wetlands are protected from further development by zoning and California Coastal Act policies. In addition, much of the area adjacent to Arcata Bay is within existing wildlife refuge areas. The wetland habitat has also been improved within the overall Humboldt Bay watershed by implementation of Sections 401 and 404 of the Federal Clean Water Act, Section 10 of the Rivers and Harbors Act, and Executive Order 11990 - Protection of Wetlands. Implementation of these regulations worked in combination to protect wetland from development or at least minimize harm to wetland.

Project Impacts That Might Contribute To a Cumulative Impact

Modified Alternative 3A, identified as the Preferred Alternative, would permanently impact approximately 8.2 acres of U.S. Army Corps of Engineers (USACE) Jurisdictional (10.2 acres combined USACE and California Coastal Commission Jurisdictional) Palustrine Emergent wetlands vegetated by grasses and other herbaceous vegetation. Approximately 0.01 acre of Estuarine Subtidal waters and 0.1 acre of Estuarine Intertidal wetland that are USACE Jurisdictional (CCC Jurisdictional the same) would be permanently impacted. There would be temporary impacts to approximately 4.5 acres of USACE Jurisdictional (4.4 acres, CCC Jurisdictional) Palustrine Emergent wetlands.

Impacts to Palustrine Emergent wetlands would occur from lane construction, installation of shoulder backing, and a new grade separation. These areas consist of narrow strips of wetlands adjacent to the paved roadway over about 20 miles on both shoulders and along the roadway median. These wetlands have relatively low functions and values (Table 3-28) because of their proximity to the road, their isolation from other wetlands and routine mowing of the area. These wetlands were previously degraded when the area was converted from a bay tidal influenced system to a freshwater system. These factors, in addition to their long, narrow shape, limit their use as habitat for wildlife. In addition, they have low-to-moderate value for sediment/ toxicant retention.

Impacts to the tidal and subtidal estuarine wetlands would result from proposed tide gate replacements, Jacoby Creek bridge (pier removal), and placing a rock weir in the Gannon Slough channel to enhance fish habitat. Tide gate replacement would include work within the 101 Slough, Gannon Slough, Old Jacoby Creek, and three unnamed ditches. The proposed southbound Jacoby Creek bridge would be a single span (no piers in the channel) structure. There would be temporary disturbance to the drainages and riparian vegetation, as well as a minor short-term decrease in water quality, due to workers walking in the channel to install and then remove debris containment systems.

The direct and indirect effects of the proposed project that could contribute to cumulative wetland impacts include an increase in impervious surface, loss of riparian vegetation, and increased shade. The increase in impervious surface within the project area ranges from 5 to12 percent, depending on the final alternative selected. Considering that the entire non-developed project area is over 90 percent wetland, just over ten feet above sea level, and is immediately adjacent to a bay, this additional paving would have a negligible effect on stormwater discharge/retention. The loss of riparian vegetation within the project area would include less than 100 square feet near bridge abutments. Trees and shrubs would be removed in several locations where the roadway would be widened. Increased shading from the replaced bridge would result in a permanent (minor) adverse effect to fish and vegetation. Some of the shade increase from the proposed southbound Jacoby Creek bridge would be offset by removal of the existing bridge.

Minimization and avoidance measures are proposed to reduce the effect of potential impacts. The proposed tide gates included in the proposed project and subsequent habitat enhancement would likely compliment future wetland and estuary restoration activities unrelated to this project (see next subsection for unrelated projects). After construction, disturbed areas would be revegetated and restored. Since wetland fills are located primarily within the existing highway medians and shoulders, the loss of wetland value and function would not be substantial. Consequently, the value and function of wetland would remain comparable to the existing condition. All temporary and permanent wetland impacts would be fully mitigated within the RSA based on coordination with regulating agencies including USACE, California Coastal Commission, and California Regional Water Quality Control Board. For more information, refer to the Conceptual Mitigation Plan (Appendix J) described earlier in this chapter.

Overall, the proposed project would not change the hydrology supporting wetland vegetation, and all direct, temporary, and permanent wetland impacts would be fully mitigated. Because project impacts are minor, localized or short-term after implementation of mitigation measures, the proposed project is not expected to result in, or contribute to substantial indirect or cumulative impact on wetland resources in the RSA.

Recently Completed, Current and Planned Projects Within the RSA

The following is a list of current and planned projects within the RSA:

Cole Avenue Median Closure. Cole Avenue is the southernmost intersection along the expressway portion of the Eureka-Arcata Route 101 Corridor. The median was closed and existing acceleration and deceleration lanes were extended at the Route 101/Airport Road intersection in 2003. Wetland impacts were fully mitigated.

Mad River Water Pipeline Rehabilitation Project. The Mad River Water Pipeline is an existing 24-inch diameter steel pipeline that was constructed mostly in the late 1930s, mainly within utility right-of-way owned by the City of Eureka. The pipeline has failed a number of times in recent years, necessitating shutdowns and jeopardizing the safety of the City's water supply. The rehabilitation project was intended to add reliability to the existing system and reduce the potential for future failures. The pipeline is located east of Route 101 outside the Eureka-Arcata Corridor project limits. Wetland impacts were mitigated. The next critical section for rehabilitation is the Frank Street to Harris Street section (phase 5), which is pending City approval for the preparation of design plans and specifications.

Jacoby Creek Estuary Expansion and Gannon Slough Tidal Restoration. Planned for the summer of 2010, this project would restore tidal habitat to former tide lands and seasonal wetland enhancement of a three-acre Palustrine area upstream of the south Gannon slough area. Soil excavated from this wetland area would be used to construct the setback levee for Jacoby creek estuary expansion. This project would enhance/restore wetland habitat. This work has been completed.

McDaniel Slough Wetland Enhancement Project. "This project will create a self-sustaining tidal marsh through the restoration of natural geomorphic and biologic processes and create brackish and freshwater wetlands on the eastern portion of the site." (Excerpt from March 2006 Draft EIR, City of Arcata and California Department of Fish and Wildlife.) Status: This project has been completed.

Old Arcata Road/Myrtle Avenue Widening and Rehabilitation Project. The County of Humboldt recently completed most of the widening and reconstruction of Old Arcata Road/Myrtle Avenue from Eureka city limits to Arcata city limits. The project includes wetland mitigation.

Humboldt Bay Trail North and South. The Humboldt Bay Trail is being developed as a collaborative effort between the Humboldt County Association of Governments, County of

Humboldt, City of Arcata, and City of Eureka . The current focus is on developing a continuous non-motor vehicle trail from central Arcata to south Eureka over the next several years for a total length of 13 miles. The trail would be situated within the U.S. Highway 101 and railroad transportation corridors. The County was allocated funds through the State Transportation Improvement Program to complete preliminary engineering, environmental studies, and permitting and to develop engineering plans and specifications for the Bay Trail South segment, which will connect V Street in Eureka to the Bracut area. This work has been initiated and is expected to require two to three years to address the various challenges and constraints. The State Coastal Conservancy has funded the initial planning for the Bay Trail North segment, which will connect the Bracut area to the Arcata Skate Park in Arcata. This project is now ready for construction and the City of Arcata, along with project partners, is actively seeking construction funding.

Rocky Gulch Salmonid Access and Habitat Restoration Project. Begin Year: 2003. Status: Ongoing. Purpose: Restore coho salmon and steelhead production from Rocky Gulch by: 1) replacing the tide gate with a structure that allows fish passage, 2) restoring an estuary above the tide gate to provide high quality salmonid rearing habitat, 3) rehabilitating the channel traversing the pasture to ensure suitable fish passage, a riparian corridor, and better drainage of tributaries to Rocky Gulch, and 4) setback dikes to restore 100-feet of stream corridor. This project would enhance/restore wetland habitat.

Washington Gulch - McKnight Site (riparian restoration) Community Involvement/Public Education Program. Begin Year: 2003. End Year: 2005. Status: Completed. Purpose: Identify, design and field supervise a Fisheries/Riparian Restoration Volunteer Program, which is designed to perform restoration activities on anadromous salmonid streams and riparian areas in Humboldt and Del Norte counties. This project would enhance/restore wetland habitat.

Humboldt Bay Wildlife Area, Jacoby Creek/Gannon Slough Unit. Begin Year: 2002. Status: Ongoing. Purpose: To acquire 25 acres of land for the protection and enhancement of riparian habitat within the Jacoby Creek drainage area, south of Arcata. This project would enhance wetland habitat.

In addition, Caltrans is proposing an off-site wetland mitigation project (for the Eureka-Arcata Route 101 Corridor Improvement Project) within the Arcata Bay watershed, which would also enhance wildlife and wetland value and functions.

All of these projects could have temporary water quality effects during construction, but would not have a substantial, unavoidable impact to wetlands or sensitive plant or animal species. Therefore, the proposed Eureka-Arcata Route 101 Corridor Improvement Project would not contribute to a substantial adverse cumulative impact to wetlands or sensitive plant and animal species. Ultimately, these projects are expected to have no post-construction impacts to wetland and most would restore or enhance wetland habitat after construction.

If construction activities related to these projects occurred in the same timeframe and within the same watercourse as the Eureka-Arcata Route 101 Corridor Improvement Project, cumulative impacts would be possible. However, Caltrans would coordinate with resource agencies to minimize and avoid impacts. Because impacts associated with the project are minor, localized and short-term, the proposed project is not expected to result in substantial indirect or cumulative impact, individually or collectively, on wetland habitat within the RSA.

Wetland Cumulative Impact Analysis Conclusion

Based on previous discussion, there would be no substantial cumulative impacts expected beyond the individual project wetland effects; therefore, mitigation for cumulative impacts would not be required. However, the City of Arcata and California Department of Fish and Wildlife-sponsored enhancement and restoration projects are expected to result in a net improvement to wetland habitat. In addition, Caltrans is proposing a wetland restoration/enhancement project at two locations within the Arcata Bay watershed. The existing and future expansion of wildlife refuges, as well as land use zoning, is expected to continue to protect and preserve the remaining wetland within the RSA. USACE, the California Department of Fish and Wildlife, and the California Coastal Commission will continue to have joint regulatory authority over the resource, and recommend actions those agencies could take to influence the sustainability of the resource.

In accordance with NEPA regulations, based on this cumulative impact analysis, there would be no anticipated cumulative impacts on wetland habitat resulting from incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. There would be no substantial cumulative impacts resulting from individually minor, yet collectively significant, actions taking place over a period of time.

In accordance with Section 15355 of the CEQA Guidelines, the cumulative analysis determined the following regarding wetland impact and the proposed project:

a. The individual effects resulting from the proposed project or a number of separate projects within the RSA were not found to be substantially cumulative.

b. There would be no anticipated cumulative impacts that could result from individually minor, but collectively significant projects taking place over a period of time.

Chapter 4 California Environmental Quality Act Evaluation

The proposed project is a joint project by the California Department of Transportation (Caltrans) and the Federal Highway Administration (FHWA) and is subject to state and federal environmental review requirements. Project documentation, therefore, has been prepared in compliance with both the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA). Caltrans is the lead agency under CEQA while the FHWA is the lead agency under NEPA.

One of the primary differences between NEPA and CEQA is the way significance is determined. Under NEPA, significance is used to determine whether an Environmental Impact Statement (EIS) or some lower level of documentation will be required. NEPA requires that an EIS be prepared when the proposed federal action (project) *as a whole* has the potential to "significantly affect the quality of the human environment." The determination of significance is based on context and intensity. Some impacts determined to be significant under CEQA may not be of sufficient magnitude to be determined significant under NEPA. Under NEPA, once a decision is made regarding the need for an EIS, it is the magnitude of the impact that is evaluated and no judgment of its individual significance is deemed important for the text. NEPA does not require that a determination of significant impacts be stated in the environmental documents.

CEQA, on the other hand, does require Caltrans to identify each "significant effect on the environment" resulting from the project and ways to mitigate each significant effect. If the project may have a significant effect on any environmental resource, then an Environmental Impact Report (EIR) must be prepared. Each and every significant effect on the environment must be disclosed in the EIR and mitigated, if feasible. In addition, the CEQA Guidelines list a number of mandatory findings of significance, which also require the preparation of an (EIR). There are no types of projects under NEPA that parallel the findings of mandatory significance of CEQA. This chapter discusses the effects of this project and CEQA significance.

Less Than Significant Effects of the Proposed Project

Less than significant effects of the proposed project are all effects other than the significant environmental effects described under the next three subject headings. Refer to the discussion in Chapter 3-Affected Environment, Environmental Consequences, and Avoidance, Minimization and/or Mitigation Measures for a detailed discussion.

Significant Environmental Effects of the Proposed Project

Without mitigation or measures to minimize harm implemented, the following are potentially significant project impacts depending on the Alternative:

- The removal of up to 83 mature trees along Route 101 would result in adverse visual impacts—see Chapter 3, Section 3.1.7 for more information. Alternative 1A has a potentially significant effect; other alternatives have less than significant visual effects on mature trees.
- Closing the median openings along the Route 101 corridor permanently could adversely delay emergency response services. See Chapter 3, Section 3.1.5—Utilities/Emergency Services for more information.
- The permanent filling of up to 12.5 acres of wetlands—see Chapter 3, Section 3.3.2 for more information.
- Some alternatives are inconsistent with the Coastal Zone Management Plan. Preferred Alternative Modified 3A, with conditions, is consistent with the Coastal Zone Management Plan. See Chapter 3, Section 3.1.1 for more information.
- Result in substantial impacts associated with construction activities including sedimentation, erosion, traffic delay, and temporary access closure/delays to businesses and residents. See Chapter 3, Water Quality and Traffic Sections for more information.

Unavoidable Significant Environmental Effects

Depending on the project alternative, the following project impacts would remain significant even after mitigation measures are implemented:

- Residents on Jacobs Avenue (Alternatives 1 and 2) and at the Redwood Coast Cabins and RV Resort in Bracut (all Alternatives) would experience travel delay resulting from out-of-direction travel by access restrictions—see Chapter 3, Section 3.1.4 for more information.
- Economic losses experienced by businesses affected by access restrictions—see Chapter 3, Section 3.1.1 for more information. This impact only applies to Alternatives 1, 1A, and 2.
- Fuel consumption beyond the No-Build condition resulting from out-of-direction travel—see Chapter 3, Section 3.2.8 for more information.

Significant Irreversible Environmental Changes

The No-Build Alternative would not directly involve the use of resources. Any one of the Build Alternatives would involve the commitment of a range of natural, physical, and human resources.

Uses of nonrenewable resources (such as during the initial and continued phases of the project) may be irreversible since a large commitment of such resources makes removal or non-use thereafter unlikely. Primary impacts, and particularly secondary impacts, (such as a highway improvement that provides access to a previously inaccessible area) generally commit future generations to similar uses. Irreversible damage can also result from environmental accidents associated with the project.

All of the Build Alternatives would affect habitat areas, special aquatic sites, and vegetation to some extent. Mitigation measures would be implemented, but creation/restoration sites may not be in the project area.

Considerable amounts of fossil fuels, labor, and construction materials (such as cement, aggregate, steel) would be expended. Workers are expected to be drawn from the regional labor pool.

Additionally, labor and natural resources are used in the fabrication and preparation of construction materials. These materials are generally not retrievable. However, they are not in short supply, and their use would not have an adverse effect upon continued availability of these resources.

Any one of the Build Alternatives would require a substantial expenditure of funds, which would not be retrievable; however, the Eureka-Arcata region would benefit from an enhanced major transportation corridor, which would outweigh the commitment of these resources.

For more information, please refer to discussions in Chapter 3, Sections 3.4 and 3.5 regarding short-term uses versus maintenance and enhancement of long-term productivity and irreversible and irretrievable commitments.

Mitigation Measures For Significant Impacts Under CEQA

The following are proposed avoidance, minimization and/or mitigation measures included in this project to reduce significant impacts (previously described in Chapter 3) to less than significant.

- Native trees and shrubs would be planted to offset the visual impact of tree removal—see Chapter 3, Section 3.1.7 for more information. Enhance, restore, and create wetlands to compensate for wetland impacts—see Chapter 3, Section 3.3.2 for more information.

- To minimize the potential adverse impacts from construction activities, including sedimentation and erosion, appropriate water quality/stormwater BMPs would be implemented. See Chapter 3, Section 3.2.1.—Water Quality for more information.

- To minimize the potential traffic delays during construction, a traffic management plan would be implemented during construction. See Chapter 3, Section 3.1.6.—Traffic and Transportation for more information.

- To minimize the potential adverse impacts from sediment transport resulting from the addition of impervious surface from new paving, permanent BMPs (such as biofiltration strips and swales) would be installed to the maximum extent practicable. See Chapter 3, Section 3.2.2—Water Quality and Stormwater Runoff for more information.

- Adhere/implement Federal Coastal Consistency Conditions for the project to be consistent with the Coastal Zone Management Plan. See Chapter 3, Section 3.1.1 for more information.

- The following sensitive species could potentially be impacted by the proposed bridge construction work at the southbound Jacoby Creek bridge: tidewater goby, northern California steelhead, coho Salmon, Chinook salmon, and Lyngbye's sedge. Impacts would be less than significant because construction work windows/restrictions and implementation of appropriate Best Management Practices would be incorporated into the project. In addition, habitat enhancement measures are proposed including installing "fish-friendly" tide gates. See Chapter 3, Sections 3.3.2 and 3.3.5 for more information.

Climate Change

Climate change refers to long-term changes in temperature, precipitation, wind patterns, and other elements of the earth's climate system. An ever-increasing body of scientific research attributes these climatological changes to greenhouse gases (GHGs), particularly those generated from the production and use of fossil fuels.

While climate change has been a concern for several decades, the establishment of the Intergovernmental Panel on Climate Change (IPCC) by the United Nations and World Meteorological Organization's in 1988, has led to increased efforts devoted to greenhouse gas (GHG) emissions reduction and climate change research and policy. These efforts are primarily concerned with the emissions of GHGs related to human activity that include carbon dioxide (CO_2), methane, nitrous oxide, tetrafluoromethane, hexafluoroethane, sulfur hexafluoride, HFC-23 (fluoroform), HFC-134a (s, s, s, 2 – tetrafluoroethane), and HFC-152a (difluoroethane).

There are typically two terms used when discussing the impacts of climate change. "Greenhouse Gas (GHG) Mitigation" is a term for reducing GHG emissions in order to reduce or "mitigate" the impacts of climate change. "Adaptation" refers to the effort of planning for and adapting to impacts due to climate change (such as adjusting transportation design standards to withstand more intense storms and higher sea levels)[29].

Transportation sources (passenger cars, light duty trucks, other trucks, buses and motorcycles) in the state of California make up the largest source (second to electricity generation) of greenhouse gas emitting sources. Conversely, the main source of GHG emissions in the United States (U.S.) is electricity generation followed by transportation. The dominant GHG emitted is CO_2, mostly from fossil fuel combustion.

There are four primary strategies for reducing GHG emissions from transportation sources: 1) improve system and operation efficiencies, 2) reduce growth of vehicle miles traveled (VMT) 3) transition to lower GHG fuels and 4) improve vehicle technologies. To be most effective, all four should be pursued collectively. The following Regulatory Setting section outlines state and federal efforts to comprehensively reduce GHG emissions from transportation sources.

Regulatory Setting

State

With the passage of several pieces of legislation, including State Senate and Assembly Bills and Executive Orders, California launched an innovative and proactive approach to dealing with GHG emissions and climate.

[29] http://climatechange.transportation.org/ghg_mitigation/

Assembly Bill 1493 (AB 1493), Pavley, Vehicular Emissions: Greenhouse Gases, 2002: This bill requires the California Air Resources Board (CARB) to develop and implement regulations to reduce automobile and light truck GHG emissions. These stricter emissions standards were designed to apply to automobiles and light trucks beginning with the 2009-model year.

Executive Order (EO) S-3-05 (June 1, 2005): The goal of this EO is to reduce California’s GHG emissions to 1) year 2000 levels by 2010, 2) year 1990 levels by 2020, and 3) 80 percent below the year 1990 levels by 2050. In 2006, this goal was further reinforced with the passage of Assembly Bill 32.

Assembly Bill 32 (AB 32), Núñez and Pavley, The Global Warming Solutions Act of 2006: AB 32 sets the same overall GHG emissions reduction goals as outlined in EO S-3-05, while further mandating that ARB create a scoping plan and implement rules to achieve “real, quantifiable, cost-effective reductions of greenhouse gases.”

Executive Order S-20-06 (October 18, 2006): This order establishes the responsibilities and roles of the Secretary of the California Environmental Protection Agency (Cal/EPA) and state agencies with regard to climate change.

Executive Order S-01-07 (January 18, 2007): This order sets forth the low carbon fuel standard for California. Under this EO, the carbon intensity of California’s transportation fuels is to be reduced by at least ten percent by 2020.

Senate Bill 97 (SB 97), Chapter 185, 2007, Greenhouse Gas Emissions: required the Governor's Office of Planning and Research (OPR) to develop recommended amendments to the California Environmental Quality Act (CEQA) Guidelines for addressing GHG emissions. The amendments became effective on March 18, 2010.

Senate Bill 375 (SB 375), Chapter 728, 2008, Sustainable Communities and Climate Protection: This bill requires the California Air Resources Board (CARB) to set regional emissions reduction targets from passenger vehicles. The Metropolitan Planning Organization (MPO) for each region must then develop a "Sustainable Communities Strategy" (SCS) that integrates transportation, land-use, and housing policies to plan for achievement of the emissions target for their region.

Senate Bill 391 (SB 391) Chapter 585, 2009 California Transportation Plan: This bill requires the State’s long-range transportation plan to meet California’s climate change goals under AB 32.

Federal

Although climate change and GHG reduction are a concern at the federal level, currently no regulations or legislation have been enacted specifically addressing GHG emissions reductions and climate change at the project level. Neither the United States Environmental Protection Agency (USEPA) nor the Federal Highway Administration (FHWA) has issued explicit guidance or methods to conduct project-level GHG analysis.[30] FHWA supports the approach that climate change considerations should be integrated throughout the transportation decision-making process—from planning through project development and delivery. Addressing climate change mitigation and adaptation up front in the planning process will assist in decision-making and improve efficiency at the program level, and will inform the analysis and stewardship needs of project-level decision-making. Climate change considerations can be integrated into many planning factors, such as supporting economic vitality and global efficiency, increasing safety and mobility, enhancing the environment, promoting energy conservation, and improving the quality of life.

The four strategies outlined by FHWA to lessen climate change impacts correlate with efforts that the state is undertaking to deal with transportation and climate change. These strategies include improved transportation system efficiency, cleaner fuels, cleaner vehicles, and a reduction in travel activity.

Climate change and its associated effects are being addressed through various efforts at the federal level to improve fuel economy and energy efficiency, such as the “National Clean Car Program” and EO 13514 - *Federal Leadership in Environmental, Energy and Economic Performance.*

Executive Order 13514 (October 5, 2009): This order is focused on reducing greenhouse gases internally in federal agency missions, programs and operations, but also directs federal agencies to participate in the Interagency Climate Change Adaptation Task Force, which is engaged in developing a national strategy for adaptation to climate change.

USEPA’s authority to regulate GHG emissions stems from the U.S. Supreme Court decision in *Massachusetts v. EPA* (2007). The Supreme Court ruled that GHGs meet the definition of air pollutants under the existing Clean Air Act and must be regulated if these gases could be reasonably anticipated to endanger public health or welfare. Responding to the Court’s ruling, USEPA finalized an endangerment finding in December 2009. Based on scientific evidence, it found that six greenhouse gases constitute a threat to public health and welfare. It is the Supreme Court’s interpretation of the existing Act and EPA’s assessment of the scientific evidence that form the basis for EPA’s regulatory actions.

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[30] To date, no national standards have been established regarding mobile source GHGs, nor has USEPA established any ambient standards, criteria or thresholds for GHGs resulting from mobile sources.

USEPA, in conjunction with NHTSA, issued the first of a series of GHG emission standards for new cars and light-duty vehicles in April 2010.[31] The USEPA and the National Highway Traffic Safety Administration (NHTSA) are taking coordinated steps to enable the production of a new generation of clean vehicles with reduced GHG emissions and improved fuel efficiency from on-road vehicles and engines. These next steps include developing the first-ever GHG regulations for heavy-duty engines and vehicles, as well as additional light-duty vehicle GHG regulations.

The final combined standards that made up the first phase of this national program applied to passenger cars, light-duty trucks, and medium-duty passenger vehicles, covering model years 2012 through 2016. The standards implemented by this program are expected to reduce GHG emissions by an estimated 960 million metric tons and 1.8 billion barrels of oil over the lifetime of the vehicles sold under the program (model years 2012-2016).

On August 28, 2012, USEPA and NHTSA issued a joint Final Rulemaking to extend the National Program for fuel economy standards to model years 2017 through 2025 passenger vehicles. Over the lifetime of model years 2017-2025 standards, this program is projected to save approximately four billion barrels of oil and two billion metric tons of GHG emissions.

The complementary USEPA and NHTSA standards that make up the Heavy-Duty National Program apply to combination tractors (semi-trucks), heavy-duty pickup trucks and vans, and vocational vehicles (including buses and refuse or utility trucks). Together, these standards will cut greenhouse gas emissions and domestic oil use significantly. This program responds to President Barack Obama's 2010 request to jointly establish greenhouse gas emissions and fuel efficiency standards for the medium- and heavy-duty highway vehicle sector. The agencies estimate that the combined standards will reduce CO_2 emissions by about 270 million metric tons and save about 530 million barrels of oil over the life of model years 2014 to 2018 heavy duty vehicles.

Project Analysis

An individual project does not generate enough GHG emissions to significantly influence global climate change. Rather, global climate change is a cumulative impact. This means that a project may participate in a potential impact through its incremental contribution combined with the contributions of all other sources of GHG.[32] In assessing cumulative impacts, it must be determined if a project's incremental effect is "cumulatively considerable." See CEQA Guidelines sections 15064(h)(1) and 15130.

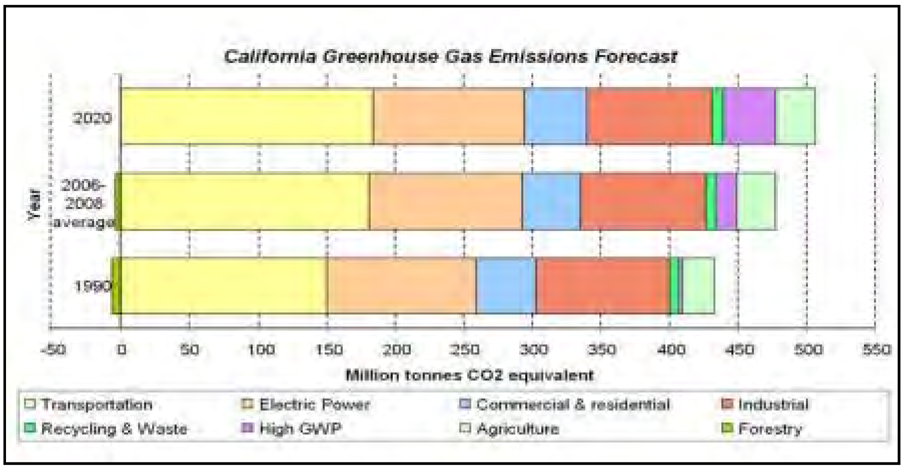
[31] http://www.c2es.org/federal/executive/epa/greenhouse-gas-regulation-faq

[32] This approach is supported by the AEP: *Recommendations by the Association of Environmental Professionals on How to Analyze GHG Emissions and Global Climate Change in CEQA Documents* (March 5, 2007), as well as the SCAQMD (Chapter 6: : The CEQA Guide, April 2011) and the US Forest Service (Climate Change Considerations in Project Level NEPA Analysis, July 13, 2009).

To make this determination, the incremental impacts of the project must be compared with the effects of past, current, and probable future projects. Gathering sufficient information on a global scale of all past, current, and future projects to make this determination is a difficult, if not impossible task.

The AB 32 Scoping Plan contains the main strategies California will use to reduce GHG. As part of its supporting documentation for the Draft Scoping Plan, CARB released the GHG inventory for California (forecast last updated in October 2010). The forecast is an estimate of the emissions expected to occur in the year 2020 if none of the foreseeable measures included in the Scoping Plan were implemented. The base year used for forecasting emissions is the average of statewide emissions in the GHG inventory for 2006, 2007, and 2008.

Figure 4-1 California Greenhouse Gas Forecast



(Source: CARB, 2014)

Caltrans, and its parent agency, the California State Transportation Agency, have taken an active role in addressing GHG emission reduction and climate change. Recognizing that 98 percent of California's GHG emissions are from the burning of fossil fuels and 40 percent of all human made GHG emissions are from transportation, Caltrans has created and is implementing the Climate Action Program published in December 2006.[33]

The purpose of the proposed project is to improve safety and to improve the operation of the intersections by reducing delay at those intersections. The project will not increase the vehicle capacity of the existing roadway, therefore a qualitative analysis of greenhouse gas emissions has been completed per Section 15064.4 of the CEQA guidelines.

[33] Caltrans Climate Action Program is located at the following web address: http://www.dot.ca.gov/hq/tpp/offices/ogm/key_reports_files/State_Wide_Strategy/Caltrans_Climate_Action_Program.pdf

In order to improve safety on this route, the proposed Build Alternatives would eliminate uncontrolled left turn movements across the median. This modification is expected to increase out-of-direction travel for local trips to businesses and residents. However, intersection level of service would be improved between Eureka and Arcata. Through traffic on Route 101 is not expected to be affected.

Although the project would not add additional through lanes that would increase the traffic carrying capacity of Route 101, traffic volumes on Route 101 and local roads are anticipated to increase due to anticipated population and development growth of the region. Consequently, VMT would increase over time as a result of the projected increase in traffic volumes independent of the proposed project. The increase in traffic volumes and miles traveled could potentially result in an increase in operational GHG emissions; however, because of State legislative bills and Executive Orders mandating greater fuel efficiency, stricter emission standards for motor vehicles, and measures to minimize VMT, GHG emissions are expected to decrease by 2041.

Project-specific measures to minimize harm were developed to avoid or offset out-of-direction travel, which would also minimize operational GHG emissions. The most effective and feasible of these measures involved modifying Alternatives 1 and 3 by signalizing or adding turnarounds which resulted in Alternative 1A (partial signalization and turnarounds) and Modified Alternative 3A (includes a half signal with a new grade separation at Route 101 and Indianola Cutoff).

In addition, all Build Alternatives would improve intersection Level of Service (LOS) compared to the existing condition where traffic queues often form at the local street and driveway intersections on Route 101. This would reduce idling vehicle engines and variable motor vehicle speeds at intersections which could result in higher GHG emissions compared to motor vehicles traveling at constant speeds.

Caltrans, along with other agencies, is planning and implementing statewide measures to reduce GHG; these measures are discussed in the following sections.

Construction Emissions

Greenhouse gas emissions for transportation projects can be divided into those produced during construction and those produced during operations. Construction GHG emissions include emissions produced as a result of material processing, emissions produced by on-site construction equipment, and emissions arising from traffic delays due to construction. These emissions would be produced at different levels throughout the construction phase. Their frequency and occurrence could be reduced through innovations in plans and specifications and by implementing better traffic management during construction phases. Construction emissions would be a one-time unavoidable consequence.

In addition, with innovations such as longer pavement lives, improved traffic management plans, and changes in materials, the GHG emissions produced during construction can be mitigated, to some degree, by longer intervals between maintenance and rehabilitation events.

Refer to Chapter 3, Section 3.2.6—Air Quality for a discussion of construction related emission effects and measures to address construction emissions that may have a benefit of reducing greenhouse gas emissions and improving energy efficiency.

Greenhouse Gas Reduction Strategies

AB 32 Compliance

Caltrans continues to be actively involved on the Governor's Climate Action Team as CARB works to implement Executive Orders S-3-05 and S-01-07 and to help achieve the targets set forth in AB 32. Many of the strategies Caltrans is using to help meet the targets in AB 32 come from the California Strategic Growth Plan, which is updated each year. Former Governor Arnold Schwarzenegger's Strategic Growth Plan calls for a $222 billion infrastructure improvement program to fortify the state's transportation system, education, housing, and waterways, including $100.7 billion in transportation funding during the next decade. The Strategic Growth Plan targets a significant decrease in traffic congestion below today's level and a corresponding reduction in GHG emissions. The Strategic Growth Plan proposes to do this while accommodating growth in population and the economy. A suite of investment options has been created that combined together are expected to reduce congestion. The Strategic Growth Plan relies on a complete systems approach to attain CO_2 reduction goals: system monitoring and evaluation, maintenance and preservation, smart land use and demand management, and operational improvements as depicted in Figure 4-2, Mobility Pyramid.

Figure 4-2 Mobility Pyramid

Caltrans supports efforts to reduce vehicle miles traveled by planning and implementing smart land use strategies: job/housing proximity, developing transit-oriented communities, and high density housing along transit corridors. Caltrans works closely with local jurisdictions on planning activities but does not have local land use planning authority. Caltrans also assists efforts to improve the energy efficiency of the transportation sector by increasing vehicle fuel economy in new cars, light and heavy-duty trucks. Caltrans is doing this by supporting ongoing research efforts at universities, by supporting legislative efforts to increase fuel economy, and by its participation on the Climate Action Team. It is important to note, however, that the control of the fuel economy standards is held by USEPA and ARB.

Caltrans also works towards enhancing the State's transportation planning process to respond to future challenges. Similar to requirements for regional transportation plans under Senate Bill (SB) 375 (Steinberg 2008), SB 391(Liu 2009) requires the State's long-range transportation plan to meet California's climate change goals under Assembly Bill (AB) 32.

The California Transportation Plan (CTP) is a statewide, long-range transportation plan to meet our future mobility needs and reduce greenhouse gas (GHG) emissions. The CTP defines performance-based goals, policies, and strategies to achieve our collective vision for California's future, statewide, integrated, multimodal transportation system.

The purpose of the CTP is to provide a common policy framework that will guide transportation investments and decisions by all levels of government, the private sector, and other transportation stakeholders. Through this policy framework, the CTP 2040 will identify the statewide transportation system needed to achieve maximum feasible GHG emission reductions while meeting the State's transportation needs.

Table 4-1 summarizes Caltrans and statewide efforts implemented to reduce GHG emissions. Additional information about each strategy is included in the Climate Action Program at Caltrans (December 2006).

Table 4-1 Climate Change/CO_2 Reduction Strategies

Strategy	Program	Partnership		Method/Process	Estimated CO_2 Savings (MMT)	
		Lead	Agency		2010	2020
Smart Land Use	Intergovernmental Review (IGR)	Caltrans	Local Governments	Review and seek to mitigate development proposals	Not Estimated	Not Estimated
	Planning Grants	Caltrans	Local and regional agencies and other stakeholders	Competitive selection process	Not Estimated	Not Estimated
	Regional Plans and Blueprint Planning	Regional Agencies	Caltrans	Regional plans and application process	.975	7.8
Operational Improvements & Intelligent Trans. System (ITS) Deployment	Strategic Growth Plan	Caltrans	Regions	State ITS; Congestion Management Plan	.07	2.17
Mainstream Energy & GHG into Plans and Projects	Office of Policy Analysis & Research; Division of Environmental Analysis	Interdepartmental effort		Policy establishment, guidelines, technical assistance	Not Estimated	Not Estimated
Educational & Information Program	Office of Policy Analysis & Research	Interdepartmental, CalEPA, CARB, CEC		Analytical report, data collection, publication, workshops, outreach	Not Estimated	Not Estimated
Fleet Greening & Fuel Diversification	Division of Equipment	Department of General Services		Fleet Replacement B20 B100	.0045	.0065 .045 .0225
Non-vehicular Conservation Measures	Energy Conservation Program	Green Action Team		Energy Conservation Opportunities	.117	.34
Portland Cement	Office of Rigid Pavement	Cement and Construction Industries		2.5 % limestone cement mix 25% fly ash cement mix > 50% fly ash/slag mix	1.2 .36	4.2 3.6
Goods Movement	Office of Goods Movement	Cal EPA, CARB, BT&H, MPOs		Goods Movement Action Plan	Not Estimated	Not Estimated
Total					**2.72**	**18.18**

Caltrans Director's Policy 30 (DP-30) Climate Change (June 22, 2012) is intended to establish a Department policy that will ensure coordinated efforts to incorporate climate change into Departmental decisions and activities.

Caltrans Activities to Address Climate Change (April 2013)[34] provides a comprehensive overview of activities undertaken by Caltrans statewide to reduce greenhouse gas emissions resulting from agency operations.

To the extent that it is applicable or feasible for the project, and through coordination with the project development team, the following measures would be included to reduce GHG emissions and potential climate change impacts resulting from the project:

1. Landscaping reduces surface warming and, through photosynthesis, decreases CO_2. The project proposes planting in the intersection slopes, drainage channels, and seeding in areas adjacent to frontage roads and planting a variety of different-sized plant material and scattered skyline trees where appropriate, but not to obstruct the view of the mountains. Revegetation efforts would help offset a potential increase in CO_2 emissions resulting from the project.

2. The project would incorporate the use of energy efficient lighting, such as LED traffic signals. LED bulbs cost $60 to $70 each, but last five to six years, compared to the one-year average lifespan of the incandescent bulbs previously used. LED bulbs consume 10 percent of the electricity of traditional lights, which would also help reduce CO_2 emissions.[35]

3. According to Caltrans Standard Specifications, the contractor must comply with all local Air Pollution Control District's rules, ordinances, and regulations regarding air quality restrictions.

In addition to the proposed project, Caltrans and the California Highway Patrol are working with regional agencies to implement Intelligent Transportation Systems (ITS) to help manage the efficiency of the existing Route 101 highway system at other locations outside the project limits. ITS is commonly referred to as electronics, communications, or information processing used singly or in combination to improve the efficiency or safety of a surface transportation system.

Caltrans also coordinates with the Humboldt County Association of Governments, County of Humboldt, and local public transit agencies to promote and provide ridesharing services, park-and-ride facilities, and non-motorized transit improvements to help manage the growth in demand for highway capacity.

[34] http://www.dot.ca.gov/hq/tpp/offices/orip/climate_change/projects_and_studies.shtml

[35] Knoxville Business Journal, "LED Lights Pay for Themselves," May 19, 2008 at http://www.knoxnews.com/news/2008/may/19/led-traffic-lights-pay-themselves/.

Statewide Adaptation Strategies

"Adaptation strategies" refer to how Caltrans and others can plan for the effects of climate change on the state's transportation infrastructure and strengthen or protect the facilities from damage. Climate change is expected to produce increased variability in precipitation, rising temperatures, rising sea levels, variability in storm surges and intensity, and the frequency and intensity of wildfires. These changes may affect the transportation infrastructure in various ways, such as damage to roadbeds from longer periods of intense heat; increasing storm damage from flooding and erosion; and inundation from rising sea levels. These effects vary by location and may, in the most extreme cases, require that a facility be relocated or redesigned. There may also be economic and strategic ramifications as a result of these types of impacts to the transportation infrastructure.

At the federal level, the Climate Change Adaptation Task Force, co-chaired by the Council on Environmental Quality (CEQ), the Office of Science and Technology Policy (OSTP), and the National Oceanic and Atmospheric Administration (NOAA), released its interagency task force progress report on October 28, 2011[36]. This report outlines the federal government's progress in expanding and strengthening the nation's capacity to better understand, prepare for, and respond to extreme events and other climate change impacts. The report provides an update on actions in key areas of federal adaptation, including building resilience in local communities, safeguarding critical natural resources such as freshwater, and providing accessible climate information and tools to help decision-makers manage climate risks.

Climate change adaptation must also involve the natural environment as well. Efforts are underway on a statewide-level to develop strategies to cope with impacts to habitat and biodiversity through planning and conservation. Results of these efforts would help California agencies plan and implement mitigation strategies for programs and projects.

On November 14, 2008, then-Governor Arnold Schwarzenegger signed EO S-13-08 which directed a number of state agencies to address California's vulnerability to sea level rise (SLR) caused by climate change. This EO set in motion several agencies and actions to address the concern of sea level rise.

In addition to addressing projected sea level rise, the California Natural Resources Agency (Resources Agency) was directed to coordinate with local, regional, state and federal public and private entities to develop The California Climate Adaptation Strategy (Dec 2009)[37], which summarizes the best-known science on climate change impacts to California, assesses California's vulnerability to the identified impacts, and then outlines solutions that can be implemented within and across state agencies to promote resiliency.

[36] http://www.whitehouse.gov/administration/eop/ceq/initiatives/adaptation

[37] http://www.energy.ca.gov/2009publications/CNRA-1000-2009-027/CNRA-1000-2009-027-F.PDF

The strategy outline is in direct response to EO S-13-08 that specifically asked the Resources Agency to identify how state agencies can respond to rising temperatures, changing precipitation patterns, sea level rise, and extreme natural events. Numerous other state agencies were involved in the creation of the Adaptation Strategy document, including the California Environmental Protection Agency; Business, Transportation and Housing; Health and Human Services; and the Department of Agriculture. The document is broken down into strategies for different sectors that include: Public Health; Biodiversity and Habitat; Ocean and Coastal Resources; Water Management; Agriculture; Forestry; and Transportation and Energy Infrastructure. As data continues to be developed and collected, the state's adaptation strategy will be updated to reflect current findings.

The National Academy of Science was directed to prepare a Sea Level Rise Assessment Report[38] to recommend how California should plan for future sea level rise. The report was released in June 2012 and included:

- Relative sea level rise projections for California, Oregon, and Washington taking into account coastal erosion rates, tidal impacts, El Niño and La Niña events, storm surge and land subsidence rates.
- The range of uncertainty in selected sea level rise projections.
- A synthesis of existing information on projected sea level rise impacts to state infrastructure (such as roads, public facilities and beaches), natural areas, and coastal and marine ecosystems.
- A discussion of future research needs regarding sea level rise.

In 2010, interim guidance was released by The Coastal Ocean Climate Action Team (CO-CAT), as well as Caltrans, as a method to initiate action and discussion of potential risks to the infrastructure of the state due to projected sea level rise. Subsequently, CO-CAT updated the Sea Level Rise guidance to include information presented in the National Academies Study.

All state agencies that are planning to construct projects in areas vulnerable to future sea level rise are directed to consider a range of sea level rise scenarios for the years 2050 and 2100 to assess project vulnerability and, to the extent feasible, reduce expected risks and increase resiliency to sea level rise. Sea level rise estimates should also be used in conjunction with information on local uplift and subsidence, coastal erosion rates, predicted higher high water levels, storm surge and storm wave data.

All projects that have filed a Notice of Preparation (NOP) as of the date of the EO S-13-08, and/or are programmed for construction funding through 2013, or are routine maintenance projects may, but are not required to, consider these planning guidelines.

[38] *Sea Level Rise for the Coasts of California, Oregon, and Washington: Past, Present, and Future* (2012) is available at: http://www.nap.edu/catalog.php?record_id=13389.

The Notice of Preparation for the Eureka-Arcata Route 101 Corridor Improvement project was filed in 2001.

Executive Order S-13-08 also directed the Business, Transportation, and Housing Agency to prepare a report to assess vulnerability of transportation systems to sea level rise affecting safety, maintenance and operational improvements of the system, and economy of the state. Caltrans continues to work on assessing the transportation system vulnerability to climate change, including the effect of sea level rise.

Currently, Caltrans is working to assess which transportation facilities are at greatest risk from climate change effects. However, without statewide planning scenarios for relative sea level rise and other climate change effects, Caltrans has not been able to determine what change, if any, may be made to its design standards for its transportation facilities. Once statewide planning scenarios become available, Caltrans will be able review its current design standards to determine what changes, if any, may be needed to protect the transportation system from sea level rise.

Climate change adaptation for transportation infrastructure involves long-term planning and risk management to address vulnerabilities in the transportation system from increased precipitation and flooding; the increased frequency and intensity of storms and wildfires; rising temperatures; and rising sea levels. Caltrans is an active participant in the efforts being conducted in response to EO S-13-08 and is mobilizing to be able to respond to the National Academy of Science Sea Level Rise Assessment Report.

Eureka-Arcata Route 101 Corridor Improvement Project Sea Level Rise Adaptation

While this project is not subject to the planning guidelines in the Executive Order S-13-08 because its Notice of Preparation was published (in 2001) prior to the Executive Order, the proposed project is within both the Coastal Zone and the 100-year floodplain. For this reason, this section includes a discussion of potential sea level rise effects.

AFFECTED ENVIRONMENT

The California Ocean Protection Council established the Sea Level Rise Task Force of the Coastal and Ocean Working Group, which released the Sea-Level Rise for Coasts of California, Oregon and Washington (National Research Council, 2012), and an update in 2013 (National Research Council, 2013). The California Coastal Commission Sea Level Rise Policy Guidance (Draft 2013 and Final 2015) reiterated the above studies and recommended adjusting for local variance based on geologic uplift or subsidence. Table 4-2 represents estimates of Sea Level Rise following the above approach from Northern Hydrology and Engineering (2015) using the estimates for Mad River Slough. Rates of subsidence vary throughout the Humboldt Bay area and may be lowest along the east and south portions of Arcata Bay where the 101 Corridor is located (Patton 2014).

Table 4-2 Sea-Level Rise Projections Using 2000 as the Baseline		
Year	**Low Estimate (inches of sea level rise)**	**High Estimate (inches of sea level rise)**
2030	4	9
2050	6	21
2100	19	59

Within the project limits, the 5.9 mile long segment of Route 101 is currently slightly above sea level and mostly within the existing 100 year floodplain. (See Chapter 3, Section 3.2.1—Hydrology and Floodplain for more information.) Most of the existing Route 101 roadway between Eureka and Arcata would be subject to SLR since it is adjacent to Humboldt Bay. To the north and south of the project limits, low-lying portions of the cities of Eureka and Arcata would also eventually be subject to SLR effects.

Although Route 101 is not adjacent to the ocean, Humboldt Bay is adjacent to Route 101 within the project limits. The Northwestern Pacific Railroad separates Route 101 and the bay. The segment of the railroad between Eureka and Arcata is not currently active and the shoreline armoring has not been maintained. A ditch separates the railroad bed from the Route 101 fill prism from the California Redwood Company Mill to the Eureka Slough. The Humboldt Bay Wildlife Refuge is adjacent to the railroad on the west, and Fay Slough Wildlife Area is adjacent to the Caltrans right-of-way on the east side south of the Indianola Cutoff. During a severe storm in 2005, wind waves from the bay topped the railroad bed, flooded adjacent lands, and partially inundated a segment of the southbound Route 101 lanes. The predicted astronomical high tide was 8 feet, but the observed high tide was 10 feet. The flooding occurred due to exceptionally high tide conditions plus wind fetch. See Figure 3-23 in Chapter 3.

Sea Level Rise Consequences

Based on the planning scenarios provided in Table 4-2, seven inches of sea level rise (SLR) could be expected in 2030 and fourteen inches by 2050. Even higher values could occur with one or more combinations of strong storms, high tide events, wind waves on the bay, and high flow events on the rivers. Unless measures to adapt to SLR are implemented, predicted future SLR would have adverse effects to the existing Route 101 corridor with or without the proposed Route 101 corridor improvement project.

The following are general SLR related consequences:

- Route 101 is a high priority commercial goods movement route locally, regionally and in the State; consequently, the cost of delays or closure due to impacts from SLR would be high.

- Route 101, with an annual average daily traffic consisting of 39,000 vehicle trips in 2013, links the two largest population centers in Humboldt County. Closure or major damage to this roadway would have severe and widespread effects to the local and regional transportation network.

- Route 101 is important for emergency response vehicles and emergency evacuations; consequently, SLR impacts could greatly increase emergency response and evacuation times.

- State Route 255 and Old Arcata Road are redundant/alternative routes to the Route 101 corridor between Eureka and Arcata. State Route 255, as well as many low-lying roads near the bay, would also be subject to SLR effects. Old Arcata Road, a two-lane road, is not designed to accommodate high traffic volumes.

The proposed project includes two new infrastructure components (new structures) that are being designed to adapt to projected SLR impacts. All of the Build Alternatives include replacing the southbound Jacoby Creek bridge. Alternatives 2, 3, and Modified Alternative 3A include constructing a new grade separation structure at Route 101 and Indianola Cutoff. These two structures would have a service life expectation of 75 years and would be designed to address SLR. The details of each sea level rise strategy are still in development as SLR data and strategies are continuing to emerging.

Sea Level Rise Adaptation

The District 1 Climate Change Vulnerability Assessment (December 2014) discussed multiple methods of adapting to rising sea levels. These methods include:

- Viaduct/Causeway: constructing an elevated causeway for the affected areas of the route.

- Raised Roads: adding earth material to raise the entire fill prism of the highway for the affected areas.

- Protective Berm: creating a new levee on the bay side of the highway.

These proposed methods for adapting to sea level rise are expensive, and have their own set of environmental impacts, most notably fill of coastal wetlands. While Caltrans and various partners are discussing these proposals through the Sea Level Rise Action Group, they are not ready to implement any of these measures at this time and on this project. However, the structures proposed in this project, including the Indianola Interchange and the Jacoby Creek bridge, would be built at an elevation above the sea level and high tides projected for 2100. This would allow for future discussions of how to adapt to sea level rise as more information comes forward, while maintaining the current infrastructure and addressing safety concerns.

Sea Level Rise Conclusion

During the final project design, sea level rise projections will be considered; however SLR adaptation measures for Route 101 and the adjacent railroad bed have not been fully studied. Planning SLR adaptation measures for the Eureka-Arcata Route 101 Corridor are ongoing. The proposed project includes improvements within the existing roadway that generally would not complicate nor foreclose opportunities for future SLR adaptation improvements. The proposed project improvements would adequately function until long term improvements that address sea level rise are constructed. As previously mentioned, the proposed bridge replacement and grade separation structure would be constructed to withstand medium projected SLR for the next 75 years.

Future improvements to address SLR would be difficult to plan, fund, and construct because of the sensitive environmental setting and the constraints to realign or elevate the 101 roadway or railroad. In the interim, higher and more frequent maintenance and repair costs to the highway and railroad are anticipated if SLR related improvements are not constructed. Caltrans staff currently participates in the Humboldt Bay Sea Level Rise Adaption Planning Working Group meetings. This group includes representatives from local cities as well as public resource agencies.

As part of the Federal Coastal Consistency process, the California Coastal Commission conditioned the proposed project as follows:

> *Prior to or concurrent with its submittal to the Commission of a coastal development permit application for the project, Caltrans will complete its "Climate Change Adaptation Pilot Strategy for Critically Vulnerable Assets in Northwest California," and the project described in the permit application to be submitted to the Commission will reflect the findings and implications contained in that study, including any necessary redesign to incorporate appropriate sea level rise-related adaptation strategies.*

A District 1, Climate Change Vulnerability Assessment and Pilot Study was prepared by GHD (December 2014). Several strategies were identified, but additional collaboration is necessary between stakeholders before a long-term strategy is implemented. In the interim, new infrastructure components will be designed in a way so that future SLR planning efforts will not be impeded.

California Environmental Quality Act Checklist

The following checklist identifies the physical, biological, social, and economic factors that might be affected by the Alternatives. For each question in the checklist, a number representing the alternative is listed under the appropriate checklist heading. For example, the determination for the first question under the topic Aesthetics indicates Alternatives 1A, 2, 3, and Modified Alternative 3A would have a less than significant impact after mitigation; Alternative 1 would have a less than significant impact; and Alternative 7 (No-Build) Alternative would have no impact. "All" indicates all Build Alternatives would apply under the specific heading. (See Chapter 2—Project Alternatives for a detailed description of each alternative.)

Even though the No-Build Alternative does not include any proposed roadway changes, traffic volumes and speeds are expected to increase in the future, which would likely necessitate closing one or more Route 101 median openings within the corridor. Closing one or more medians could potentially restrict access to businesses and residents, add out-of-direction travel and delay, increase fuel consumption, and adversely affect the LOS of local streets as well as State Route 255. For the purpose of completing this checklist, however, the No-Build Alternative describes the existing highway condition.

Most of the supporting documentation for all CEQA environmental topic checklist items is summarized in Chapter 3 of this Environmental Impact Report/Environmental Impact Statement. A NO IMPACT answer in the last column reflects this determination. Where there is a need for clarifying discussion, the discussion is included either following the applicable section of the checklist or is within the body of the environmental document itself. The words "significant" and "significance" used throughout the following checklist are related to CEQA, not NEPA, impacts. The questions in this form are intended to encourage the thoughtful assessment of impacts and do not represent thresholds of significance. However, CEQA specific significance determinations are discussed in this chapter.

NOTE: Modified Alternative 3A is abbreviated as M3A in the checklist.

	Potentially significant impact	Less than significant impact with mitigation	Less than significant impact	No impact
AESTHETICS – Would the project:				
a) Have a substantial adverse effect on a scenic vista?		1A, 2, 3, M3A	1	7
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic building **within a state scenic highway**?				All
c) Substantially degrade the existing visual character or quality of the site and its surroundings?		1A, 2, 3, M3A	1	7
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?			All	7
AGRICULTURE RESOURCES – In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. Would the project:				
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?				All
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?				All
c) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use?				All
d) Result in the loss of forest land or conversion of forest land to non-forest use?				All
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?				All

	Potentially significant impact	Less than significant impact with mitigation	Less than significant impact	No impact
AIR QUALITY – Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?			All	7
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?			All	7
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?			All	7
d) Expose sensitive receptors to substantial pollutant concentration?			All	7
e) Create objectionable odors affecting a substantial number of people?			All	7
BIOLOGICAL RESOURCES – Would the project:				
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?		All		7
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?		All		7
C) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?		All		7

	Potentially significant impact	Less than significant impact with mitigation	Less than significant impact	No impact
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?		All		7
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?				All 7
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?			All	7
COMMUNITY RESOURCES – Would the project:				
a) Cause disruption of orderly planned development?			All	7
b) Be inconsistent with a Coastal Zone Management Plan?		All		7
c) Affect lifestyles or neighborhood character or stability?			All	7
d) Physically divide an established community?				All, 7
e) Affect minority, low-income, elderly, disabled, transit-dependent, or other specific interest group?	1,1A,2		3, M3A	7
f) Affect employment, industry, or commerce, or require the displacement of businesses or farms?	1,1A,2		3, M3A	7
g) Affect property values or the local tax base?			All	7
h) Affect any community facilities (including medical, educational, scientific, or religious institutions, ceremonial sites or sacred shrines?			All	7
i) Result in alterations to waterborne, rail, or air traffic?				All, 7
j) Support large commercial or residential development?			All	7

	Potentially significant impact	Less than significant impact with mitigation	Less than significant impact	No impact
k) Affect wild or scenic rivers or natural landmarks?			All	
l) Result in substantial impacts associated with construction activities (e.g., noise, dust, temporary drainage, traffic detours, and temporary access, etc.)?		All		7
CULTURAL RESOURCES – Would the project:				
a) Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?				All, 7
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?				All, 7
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?				All, 7
d) Disturb any human remains, including those interred outside of formal cemeteries?				All, 7
GEOLOGY AND SOILS – Would the project:				
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:			All	7
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.				All ,7
ii) Strong seismic ground shaking?			All	7
iii) Seismic-related ground failure, including liquefaction?			All	7
iv) Landslides?				All, 7
b) Result in substantial soil erosion or the loss of topsoil?			All	7

	Potentially significant impact	Less than significant impact with mitigation	Less than significant impact	No impact
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?			All	7
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property.				All ,7
e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?				All, 7

GREENHOUSE GAS EMISSIONS: Would the project:

a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

An assessment of the greenhouse gas emissions and climate change is included in the body of the environmental document. While Caltrans has included this good faith effort in order to provide the public and decision-makers as much information as possible about the project, it is Caltrans determination that in the absence of further regulatory or scientific information related to GHG emissions and CEQA significance, it is too speculative to make a significance determination regarding the project's direct and indirect impact with respect to climate change. Caltrans does remain firmly committed to implementing measures to help reduce the potential effects of the project. These measures are outlined in the body of the environmental document.

HAZARDS AND HAZARDOUS MATERIALS – Would the project:

	Potentially significant impact	Less than significant impact with mitigation	Less than significant impact	No impact
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?			All	7
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?			All	7
c) Emit hazardous emissions or handle hazardous or acutely hazardous material, substances, or waste within one-quarter mile of an existing or proposed school?			All	7

	Potentially significant impact	Less than significant impact with mitigation	Less than significant impact	No impact
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?				All, 7
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?			All	7
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?				All, 7
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?			All	7
h) Expose people or structures to a significant risk of loss, injury or death involving wild land fires, including where wild lands are adjacent to urbanized areas or where residences are intermixed with wild lands?				All, 7
HYDROLOGY AND WATER QUALITY – Would the project:				
a) Violate any water quality standards or waste discharge requirements?			All	7
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?				All,7
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?			All	7
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?			All	7

	Potentially significant impact	Less than significant impact with mitigation	Less than significant impact	No impact
e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?			All	7
f) Otherwise substantially degrade water quality?			All	7
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?				All
h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?			All	7
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?				All,7
j) Inundation by seiche, tsunami, or mudflow?			All	7
LAND USE AND PLANNING – Would the project:				
a) Physically divide an established community?				All
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?			All	7
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?				All,7
MINERAL RESOURCES – Would the project:				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?				All,7
b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?				All,7

	Potentially significant impact	Less than significant impact with mitigation	Less than significant impact	No impact
NOISE – Would the project:				
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?			All	7
b) Exposure of persons to or generation of excessive ground borne vibration or ground borne noise levels?			All	7
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?			All	7
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?			All	7
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?				All,7
f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?				All,7
POPULATION AND HOUSING – Would the project:				
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?			All	7
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?				All,7
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?				All,7

	Potentially significant impact	Less than significant impact with mitigation	Less than significant impact	No impact
PUBLIC SERVICES -				
a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:				
Fire protection?		All		7
Police protection?		All		7
Schools?				All,7
Parks?				All,7
Other public facilities?				All,7
RECREATION -				
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?				All,7
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?				All,7
TRANSPORTATION/TRAFFIC – Would the project:				
a) Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?			All	7

	Potentially significant impact	Less than significant impact with mitigation	Less than significant impact	No impact
b) Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?			All	7
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?				All,7
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incomplete uses (e.g., farm equipment)?				All,7
e) Result in inadequate emergency access?			All	7
f) Conflict with adopted policies, plans or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?			All	7

UTILITY AND SERVICE SYSTEMS – Would the project:

	Potentially significant impact	Less than significant impact with mitigation	Less than significant impact	No impact
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?				All,7
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?				All,7
c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?				All,7
d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?				All,7
e) Result in determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?				All,7
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?				All,7
g) Comply with federal, state, and local statutes and regulations related to solid waste?				All,7

	Potentially significant impact	Less than significant impact with mitigation	Less than significant impact	No impact
MANDATORY FINDINGS OF SIGNIFICANCE -				
a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, or cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?		All		7
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?			All	7
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?		All		7

Chapter 5 Summary Of Public / Agency Involvement Process / Tribal Coordination

Early and continuing coordination with the general public and appropriate public agencies is an essential part of the environmental process to determine the scope of environmental documentation, the level of analysis, potential effects, and measures to minimize or avoid harm and related environmental requirements. Agency consultation and public participation for this project have been accomplished through a variety of formal and informal methods, including: project development team meetings, interagency coordination meetings, and presentations at public meetings. This chapter summarizes the results of Caltrans' efforts to fully identify, address, and resolve project-related issues through early and ongoing coordination.

Early Project Planning

Community outreach for the Route 101 corridor traffic and safety projects began in March 2000 when Caltrans and Humboldt County Association of Governments (HCAOG) were in the process of preparing the Project Study Report. Caltrans held a public informational meeting on March 7, 2000, to discuss traffic safety and operational improvement alternatives along the Route 101 corridor, including upgrading the expressway to a freeway. Public comments on proposed alternatives were received through March 24, 2000. Approximately 150 people attended during the three-hour period. Comments received from the public included concerns about wetland impacts, potential change in factors influencing development growth, impacts to local streets, bicycle accommodation, and interest in assessing public rail and bus transit as a congestion solution.

Project alternatives proposed by Caltrans and HCAOG and associated documents (such as the Project Study Report, Supplemental Project Report, Value Analysis Study Report, etc.) have undergone review by Caltrans' Project Development Team and HCAOG's Citizens Advisory Committee, which has representatives from different geographic areas as well as different transportation modal interest groups.

A multi-agency Eureka-Arcata Corridor Safety Task Force was established on September 17, 2001, with representatives from local cities, the county as well as local law enforcement agencies. The purpose of this task force was to make recommendations on interim safety improvements for the corridor, monitor the effectiveness of measures taken, and provide input on any additional improvements that might be necessary.

As part of the safety education and promotional effort, the task force created the “Give a Minute, Safe a Life” campaign and developed educational materials and public service announcements to help publicize the program. The Safety Corridor measures were implemented in May 2002. (See Chapter 1 for more information regarding the Safety Corridor.)

Scoping

Scoping is the process for determining the range of project related issues to be addressed in an Environmental Impact Statement (EIS) and for identifying substantial issues to be analyzed in depth in an EIS.

In compliance with NEPA, a Notice of Intent (NOI) to prepare an Environmental Impact Statement was published in the Federal Register on August 31, 2001. In compliance with CEQA, the State Clearinghouse to reviewing agencies sent a Notice of Preparation for an Environmental Impact Report on September 7, 2001.

A Public Scoping Meeting was held September 20, 2001, in Eureka to identify project-related environmental issues or concerns at the beginning of the formal environmental documentation process. Caltrans staff explained the traffic safety and operations improvement alternatives/options that were under consideration, answered questions, and listened to comments. Approximately fifty people attended. Most comments were in support of the project; however, comments also reflected concerns for restricting access to businesses and wetland impacts.

A separate meeting with resource agencies was held earlier on the same day. Representatives from the following agencies attended: California Coastal Commission, Humboldt Bay Harbor Recreation and Conservation District, California Department of Fish and Wildlife, U.S. Fish and Wildlife Service, National Oceanic and Atmospheric Administration-Fisheries, and U.S. Army Corps of Engineers. Comments received were similar to those from the public meeting; however, there was a greater emphasis on wetlands, endangered species, visual effect of the proposed Indianola Cutoff grade separation structure, and wetland mitigation prospects.

The main concerns associated with the Alternatives under consideration included:

- The potential economic impact of median closures on the businesses and residents located along the Route 101 corridor;
- Possible loss of farmland or displacement of businesses;
- The potential impact of increased traffic on safety and quality of life in the small communities located along Old Arcata Road or the Samoa Peninsula;

- The potential for removing a constraint to develop “big box” or strip commercial development in the area of the proposed Route 101/Indianola Cutoff grade separation (Alternatives 2, 3, and Modified Alternative 3A only);
- The potential impact on bicycle safety; and
- The potential impact of doing nothing, which could make entering and exiting Route 101 increasingly difficult as population growth and economic expansion continues in the future.

In early 2006, roadway rehabilitation work and new alternatives were added to the project necessitating a second Notice of Intent (NOI) and Notice of Preparation (NOP). The second NOI was published in the Federal Register on May 26, 2006. The second NOP for the Eureka-Arcata Route 101 Corridor Improvement Project was submitted on May 23, 2006, to the State Clearinghouse. In addition to the NOP submittal, a press release was sent out on May 23, 2006, notifying the public of the combined Eureka-Arcata project and preparation of the EIR. The public comment period closed June 16, 2006.

Copies of the NOIs, NOPs, public meeting notice, and written comments submitted by the public are included in Appendix K.

May 2003 Open House

Caltrans held a public open house in Eureka on May 15, 2003. Project information including refined project alternatives and preliminary study findings were presented. Many area residents, as well as representatives of some of the business and property owners in the Route 101 corridor, attended this meeting. Some of the business owners expressed concern about the potential closure of median openings along Route 101 and the effect this could have on their business, income and property values. Others expressed the view that the project was essential for safety. Owners of businesses that provide one-of-a-kind merchandise, have few competitors in the area, and/or have a loyal customer base expressed the view that their businesses would not be affected by any of the project alternatives. Other business owners stated that increased travel times and out-of-direction travel would drive many of their customers to competitors and possibly force them out of business.

Additionally, concerns were raised regarding increased traffic on Route 255, where traffic volumes increased by approximately 30 percent after the Safety Corridor was implemented. Residents along Route 255 expressed strong interest in developing a project that would reduce speeds on Route 255.

The meeting also provided an opportunity for the public to submit comments to the Project Development Team. Copies of written comments received from the public are included in this chapter.

August 2007 Public Hearing and Circulation of Draft Environmental Impact Report/Study

On August 7, 2007, Caltrans, HCAOG, and FHWA held a public hearing at the Adorni Center in Eureka to provide the public an opportunity to review project information, including the results from the DEIR/S, and submit comments. Eighty-seven people signed the meeting attendance sheets. The public meeting followed an informal open forum format with no formal presentations or group audience question and answer period. Public comments were individually submitted on comment cards and letters during and after the public hearing. In addition to written comments, five individuals provided verbal comments that were transcribed by a court reporter at the hearing. There were no resolutions or petitions received during the hearing or the comment period. The DEIR/S review and comment period was extended from August 24, 2007, to September 28, 2007. Copies of all written public comments are included in Volume II of the Final Environmental Impact Report/Statement.

Summary of common questions and comments at the meeting:

- Bicycle safety concerns with a raised speed limit;
- Growth and projected volume of vehicles on Route 101;
- Concerns that the proposed Build Alternatives do not include a bicycle lane or public transit features;
- Concern that traffic would be diverted to State Route 255 during construction;
- Various concerns pertaining to the Murray Field Airport;
- Request for regularly scheduled roadway debris cleaning for bicycle safety;
- Safety concern if posted speed limit is increased after project construction;
- Global warming/sea level rise;
- Vehicle fuel consumption of out-of-direction travel;
- Safety concerns pertaining to a proposed signal at Route 101 and Airport Road;
- Tree removal concerns;
- Requests for a citizen advisory committee to provide feedback and suggestions for the project development team.

December 2008 Open House

In response to comments, Caltrans staff modified two of the existing alternatives to avoid adverse effects, which resulted in the design of Alternatives 1A and Modified Alternative 3A. These two alternatives were presented to the public at a December 3, 2008, open house at the Wharfinger Building in Eureka. One hundred forty-four people signed the meeting attendance sheets. The public meeting followed an informal open forum format with no formal presentations or group audience question and answer period. Formal comments were individually submitted on comment cards, letters, and electronic mailings. There were no resolutions or petitions received during the meeting or the comment period. Copies of all written public comments are included in Volume III and IV of the Final Environmental Impact Report/Statement.

Other Public Participation, Outreach, and Coordination

In addition to the public participation efforts described above, Caltrans made special efforts to reach out and involve residents of Lazy J Trailer Ranch and the Redwood Coast Cabins and RV Resort (formerly Eureka KOA) in the Route 101 Corridor Improvement Project area. In spring 2004, invitations were sent to all 54 units at Lazy J Trailer Ranch inviting residents to attend a focused meeting with Caltrans staff from 6:00 to 7:00 PM on April 15, 2004, at the City Council Chambers in Eureka City Hall.

Caltrans also sponsored two meetings on the evening of December 8, 2004, for residents along the Route 101 corridor. The first meeting was from 5:00 PM to 6:00 PM at the Carl Johnson Store at 3950 Jacobs Avenue, immediately adjacent to the Lazy J Trailer Ranch. The second was from 7:00 to 8:00 PM at the Caltrans Maintenance facility, adjacent to the Redwood Coast Cabins and RV Resort.

Caltrans also published two project newsletters; the most recent one published in September 2003.

On July 27, 2006, Caltrans staff met with California Coastal Commission staff to discuss bicycle access and tree removal within the Eureka-Arcata Corridor.

On July 31, 2006, Caltrans staff met with Local, State, and Federal Agencies to discuss wetland impacts, avoidance, minimization and mitigation measures; tide gate replacement; bridge widening at Gannon Slough; and bridge replacement at Jacoby Creek. The Eureka-Arcata Corridor Improvement Project was featured at the Caltrans information booth at the 2006 Humboldt County Fair in Ferndale, California, from August 10 to 20, 2006.

On December 7, 2007, Caltrans representatives met with representatives of Keep Eureka Beautiful as well as Connie Stewart, representing then-Assembly member Patty Berg.

Caltrans presented two modified Alternatives to the Executive Director of the California Coastal Commission on June 9, 2007, to discuss tree preservation options and the project. Caltrans staff agreed to evaluate the history of collisions involving trees to develop recommendations regarding decisions to either remove or protect trees within the clear recovery zone.

Project Website

Caltrans staff maintained a project website for nearly the duration of the environmental studies. The entire 2007 Draft Environmental Impact Report/Statement was posted at this website as well as project updates, reports, and schedule. Finally, contact information for project staff was also posted at this website to allow the public to ask questions or submit comments: http://www.dot.ca.gov/dist1/d1projects/eureka_arcata/

Project Blog

Caltrans staff maintained a project blog starting in 2013 to provide project-related news and updates. http://eurekaarcatacorridor.wordpress.com/

Formal Project Development Team Meetings

Representatives from the following organizations, as well as Caltrans representatives, constitute the Project Development Team (PDT), which provided and will continue to provide guidance to Caltrans staff preparing the preliminary engineering design and environmental documentation: U.S. Environmental Protection Agency, U.S. Army Corps of Engineers, National Oceanic and Atmospheric Administration—Fisheries, HCAOG, U.S. Fish and Wildlife Service, California Coastal Commission, City of Arcata Public Works, Federal Highway Administration (FHWA), Eureka Police Department, Table Bluff Reservation, California Highway Patrol, the County of Humboldt Planning Department, and the County of Humboldt Public Works Department. The PDT met on the following dates:

8-23-01 – Project kick-off meeting

10-3-02 – Discussed draft traffic alternatives report and project designs

7-22-04 – Discussed possible new project alternatives

9-16-04 – Continued discussion of possible new project alternatives

10-9-08 – Presented modified Alternatives 1A and Modified Alternative 3A

03-6-14 – Provided project updates and requested team concurrence on identifying Modified Alternative 3A as the Preferred Alternative

Tribal Coordination

Caltrans initiated consultation efforts with the various Native American Tribes of the area in 2002. Appendix C of the Archaeological Survey Report (ASR), completed by Morgan et al. (2006), contains copies of a majority of the Native American correspondence for this project. The ASR also contains a written summary of verbal consultation conducted for this project. Table Bluff Rancheria (Wiyot Tribe) was identified by all as the group to speak to regarding this project and its potential effects to culturally sensitive areas. Consequently, the Wiyot Tribe has been the focus of a majority of the consultation efforts.

The Table Bluff Rancheria (Wiyot Tribe) were invited and attended the Project Development Team (PDT) meeting on October 3, 2002. Marnie Atkins, Cultural Resource Coordinator for the Tribe, noted that the Tribe was concerned about potential impacts to culturally sensitive areas along Old Arcata Road, as it would receive more traffic during the building of this project. As a result, no changes or alterations to Old Arcata Road were proposed as part of this project.

Caltrans requested from the Native American Heritage Commission a review of the Sacred Lands File and list of potential Native American individuals/organizations that might have knowledge of cultural resources in the project area. Caltrans received a response on October 31, 2002, which noted no known Native American cultural resources were in the project area. A list of Native American individuals/organizations was also received.

On January 21, 2014, Caltrans met with the following Tribal Historic Preservation Office representatives to provide project updates:

Thomas Torma, Wiyot Tribe - Table Bluff Reservation

Janet P. Eidsness, Blue Lake Rancheria Tribe of Indians

Erika Cooper, Bear River Band of Rohnerville Rancheria

Information provided by Tribes and Native individuals is considered confidential.

State Historic Preservation Officer

The State Office of Historic Preservation sent a Letter of Concurrence, dated November 29, 2006, regarding all evaluated properties, except one, in terms of eligibility for the National Register of Historic Places (NRHP). The letter included a concurrence with the Caltrans determination that 17 properties evaluated were not NRHP eligible. The letter did not concur with Caltrans' NRHP eligibility determination that a portion of the Murray Field Airport was eligible, but recommended it be treated as NRHP eligible. In addition, the letter concurred with the Finding of No Adverse Effect standard conditions in terms of the project's overall effects to cultural resources. See Appendix M.

Citizen Advisory Committee

The Humboldt County Association of Governments, working in cooperation with Caltrans, formed a Citizen Advisory Committee (CAC). The CAC has and will continue to function in an advisory capacity to the PDT to express community opinions and concerns. CAC topics have included neighborhood associations, business interests, environmental groups, advocacy groups, and special interests. The first meeting was held March 6, 2002, and the project Alternatives and environmental process were described. A second meeting was held July 1, 2004, to discuss residential/business concerns along Jacobs Avenue.

At this time there has been no formal feedback from the CAC to the PDT; however, some concern has been expressed from CAC members through HCAOG over potential effects to businesses, customers, and residents resulting from out-of-direction travel created by access restrictions.

The CAC met November 6, 2008. Two modified Alternatives were presented to the committee. Bicycle crossing and driver concerns were raised regarding Alternative 1A.

The CAC met October 27, 2009. Caltrans Project Engineer Todd Lark provided an update/informational presentation regarding Alternative 3A, which has since been replaced by Modified Alternative 3A and identified as the Preferred Alternative.

VA Team Meeting

Because the project exceeds $25 million, and because of the high level of public interest in the project, a Value Analysis (VA) was performed for the project in 2002. The VA team comprised representatives from Caltrans, the California Department of Fish and Wildlife, City of Eureka, U.S. Fish and Wildlife Service, and one private citizen from the City of Arcata. (See Chapter 2 for more information about the VA process.)

Federal Coastal Consistency Certification

Caltrans staff made a presentation to the California Coastal Commission at a meeting on September 12, 2013, at the Wharfinger Building in Eureka in support of Federal Coastal Consistency for the proposed Eureka-Arcata 101 Corridor Improvement Project. The meeting was open to the public and the public was invited to submit verbal and written comments.

Project Manager's speaking engagements on Eureka-Arcata Corridor Improvement Project

In addition to Caltrans-sponsored public meetings, Kim Floyd, Caltrans Project Manager, or Todd Lark, Project Engineer for the Eureka-Arcata Corridor Improvement Project, attended the following local and regional government meetings to make presentations, provide project updates, and answer questions.

Humboldt County Board of Supervisors – August 21, 2001, September 23, 2003, September 18, 2007, September 23, 2008, January 20, 2009, September 14, 2009, September 22, 2009 and October 7, 2009, November 1, 2011 and November 14, 2011

Humboldt County Planning Commission Study Session – March 7, 2002

Eureka City Council – September 16, 2003

Corridor Advisory Committee Meeting – October 1, 2003

Arcata City Council meetings – September 5, 2007, October 2003, November 2, 2011

HCAOG meetings – September 27, 2007, September 25, 2008, January 22, 2009 and September 24, 2009, January 28, 2010 and October 28, 2010, June 11, 2011, October 28, 2011, November 3, 2011, December 1, 2011, February 21, 2013

Caltrans personnel also attended various meetings with public resource agencies and non-profit organizations:

Arcata Kiwanis Club – October 1, 2001

Eureka Chamber of Commerce – October 11, 2001

McKinleyville Chamber of Commerce – November 5, 2001

Focus on Bayside – January 30th, 2002

McKinleyville Kiwanis Club – April 16, 2002

Humboldt Bay Kiwanis Club – June 12, 2003

Corridor Access Project (CAP) Working Group – April 25, 2006 and July 23, 2003

Met with Coastal Commission staff on April 6, 2006, and July 27, 2006

Met with resource agencies August 14, 2006, to discuss fish-friendly tide gates and listed Threatened and Endangered Species

Provided an informational field tour of the Eureka-Arcata Route 101 Corridor and described the proposed project to California Coastal Commission staff and commissioners on September 14, 2006

Met with resource agencies October 24, 2006, to discuss Draft Conceptual Wetland Mitigation Plan

Project Manager met with Robert Merrill and Melanie Faust of the California Coastal Commission on October 31, 2006, to discuss California Coastal Trail as it relates to the project, as well as other project issues

Information booth at annual Farm Store pet fair – Saturday, September 8, 2007

Citizens for Port Development – April 2, 2008

Met with Coastal Commission staff – October 2008

Met with Green Wheels – November 17, 2008

Met with Coastal Commission Executive Director and staff – April 1, 2009

Met with U.S. Army Corps of Engineers staff – March 31, 2010

Met with Coastal Commission Executive Director and staff – September 16, 2010

Met with Coastal Commission staff – July 11, 2011

Newspaper Articles

The Eureka-Arcata Route 101 Corridor Improvement project has been the subject of numerous articles, opinion-editorials, and letters to the editors of several newspapers. The following is a sampling of article titles:

- “Slow progress on fix for deadly stretch of highway.” *McKinleyville Press*. 1-30-02.
- “Making Highway 101 Safer: No Quick Fixes.” 2-1-02.
- “Caltrans unveils possible plans for safety corridor.” *Times-Standard*. 5-17-03.
- “Safety Corridor works – but not for Manila.” *The Arcata Eye*. 7-22-06.

- "Caltrans moves forward with 'safety corridor.'" *The Eureka Reporter*. 5-24-06.
- "The COG and the Machine." *North Coast Journal*. 11-15-07.
- "Caltrans presents two additional safety corridor alternatives." *Times-Standard*. 9-27-08.
- "Caltrans seeks public input." *Times-Standard*. 12-1-08.
- "Caltrans addresses safety corridor project concerns." *Times-Standard*. 12-4-08.
- "O, Eucalyptus." *North Coast Journal*. 1-8-09.
- "Next step in Caltrans safety corridor project." *Times-Standard*. 1-21-09.
- "Caltrans' safety corridor presentation highlights dissension." *Times-Standard*. 9-23-09.
- "Eureka backs Caltrans' proposal; safety corridor project would close most medians, put stoplight at Jacobs Avenue." *Times-Standard*. 11-03-2011.
- "Supervisors seek input on U.S. Highway 101 project; funding project means others might be delayed." *Times-Standard*. 11-13-2011.
- "HCAOG decides to support $16 million Highway 101 plan; phased project to go before Coastal Commission." *Times-Standard.* 12-02-2011.
- "Supes delay decision on funds to improve transportation; board approves airport parking fee increase." *Times-Standard.* 11-02-2011.

List of Public Involvement Documents

The following documents are included in Appendix K:

8-31-2001 Federal Register Notice of Intent to prepare an Environmental Impact Statement for the Eureka-Arcata Route 101 Corridor Improvement Project

9-7-2001 Governor's Office of Planning and Research State Clearinghouse Notice of Preparation for the Eureka-Arcata Route 101 Corridor Improvement Project

Newspaper public notice for 9-20-2001 public open house

5-4-2003 Newspaper public notice announcing public information meeting

5-8-2006 News release of announcement of re-initiating environmental documentation process for additional proposed improvements

5-25-2006 Wiyot Tribe response to Notice of Preparation

5-26-2006 Governor's Office of Planning and Research State Clearinghouse Second Notice of Preparation for additional proposed improvements

5-26-2006 Federal Register Notice of Intent to prepare an Environmental Impact Statement for the Eureka-Arcata Route 101 Corridor Improvement Project for additional proposed improvements

6-16-2006 County of Humboldt response to Notice of Preparation

6-16-2006 U.S. Coast Guard response to Notice of Preparation

6-23-2006 California Department of Fish and Wildlife response to Notice of Preparation

6-26-2006 California Department of Toxic Substances Control response to Notice of Preparation

8-2-2006 U.S. Fish and Wildlife Service response to Notice of Preparation

11-29-2006 California Office of Historic Preservation, Letter of Concurrence

7-6-2007 Federal Register Notice Draft Environmental Impact Report/Statement availability and public comment period

7-10-2007 Newspaper public notice announcing Draft Environmental Impact Report/Statement availability, public hearing, and comment period

8-3-2007 Federal Register Notice announcing extension of public comment period

12-1-2008 Newspaper article announcing 12-3-2008 public meeting to present modified project alternatives

12-12-2008 News Release announcing Eureka-Arcata Route 101 Corridor Improvement project update and comment period

8-23-2013 Coastal Consistency Certification public hearing notice

Chapter 6 Mitigation And Monitoring Commitments

Mitigation Measures For Significant Impacts Under CEQA

The following are proposed avoidance, minimization and/or mitigation measures included in this project for each significant impact listed in Chapter 4.

- Tree, shrub planting to offset tree removal—see Chapter 3, Section 3.1.7 for more information.
- Enhance, restore, and create wetlands to offset permanent filling of wetlands—see Chapter 3, Section 3.3.2 for more information. A final Wetland Mitigation Plan will be completed after the FEIR/S is finalized. The final Mitigation Plan would require mitigation monitoring and performance standards, thereby ensuring that successful mitigation has been established. Performance standards would conform to the standards of the USACE's South Pacific Division Uniform Performance Standards, California Coastal Commission, North Coast Regional Water Quality Control Board, and the California Department of Fish and Wildlife, or as otherwise developed in coordination with applicable regulatory agencies. This wetland mitigation project is being developed as a separate project and is originally described in the Conceptual Mitigation Plan (Appendix J) and the Humboldt Bay Area Mitigation Concept Design Report (Appendix N).
- A biological monitor would be present during all in-stream activities associated with southbound Jacoby Creek bridge demolition, the removal of existing piers, and placement of the new bridge. Placement of the rock weir in Gannon Slough would also be monitored by a qualified biologist.
- No heavy equipment access within any watercourse channels.
- Bridge demolition activity would comply with Caltrans BMP NS-15 Structure Demolition/Removal Over or Adjacent to Water.
- Caltrans is working with emergency response agencies to identify appropriate median openings along the Route 101 corridor that would only be used by emergency vehicles. With emergency access openings in place after construction, impacts on service providers would not be substantial.
- Best Management Practices to avoid and minimize adverse water quality effects during and after construction would be implemented – see Chapter 3, Section 3.2.2 for more information.

- To be consistent with the Coastal Management Zone, the Coastal Commission is requiring the project to incorporate these conditions:

  1. ***Coastal Trail Planning***. Construction of the Route 101 Corridor Improvements will not commence until adequate commitments are in place to assure that a separate Class 1 bike and pedestrian trail, parallel to Route 101 from Arcata to the northern end of downtown Eureka, will be constructed and operational by the time the major project components are completed. Such commitments will include, but may not be limited to, assurances that adequate funding for construction of the trail exists, as well as a demonstration that the necessary assurances are in place to secure ownership interests or permissions to enable the trail construction to proceed in a timely manner, prior to or concurrent with construction of the corridor improvements.

  2. ***Visual Impact Mitigation.*** Prior to or concurrent with its submittal to the Commission of a Coastal Development Permit application for the project at issue, Caltrans will develop and submit a plan to the satisfaction of the Executive Director to provide mitigation for the visual impacts of the project by removing, to the maximum extent feasible, all billboards along the corridor, as well as other overhead infrastructure (such as power poles and power lines), and by steepening the inside slopes proposed for the Indianola interchange to maximize the view towards the bay from Indianola Cutoff.

  3. ***Wetland Mitigation.*** Prior to or concurrent with its submittal to the Commission of a Coastal Development Permit application for the project at issue, Caltrans will: (1) expand the Samoa restoration concept to include true tidal restoration; (2) provide a biological analysis showing that the acreages are adequate and/or habitat mixes would, in fact, fully mitigate the project's impacts; (3) submit and receive Commission approval of Coastal Development Permits for the restoration activities at the two sites; and (4) follow up on Caltrans' commitment to further substantiate the unavailability and infeasibility of non-agricultural sites in the Humboldt Bay area.

  4. ***Sea Level Rise Planning.*** Prior to or concurrent with its submittal to the Commission of a Coastal Development Permit application for the project, Caltrans will complete its "Climate Change Adaptation Pilot Strategy for Critically Vulnerable Assets in Northwest California," and the project described in the permit application to be submitted to the Commission will reflect the findings and implications contained in that study, including any necessary redesign to incorporate appropriate sea level rise-related adaptation strategies.

Measures to Avoid or Minimize Non-significant Impacts

- The construction contractor would only be allowed to stage on existing paved roadway or gravel turnouts or otherwise use unpaved areas shown on plans.
- Fencing would be installed prior to construction activities to identify sensitive cultural/biological resources to avoid.
- Revegetation would be initiated within one year of slope disturbance.
- The District Archaeologist would receive at least two weeks' notice that the work will begin, for purposes of scheduling monitoring and setting up ESA fencing.
- In the event that items of significance to the Tribe are unearthed during earthmoving activities, it has been agreed through consultation between Caltrans and the Table Bluff Wiyot Tribe that the Tribe would monitor further construction activities.
- A National Emission Standards for Hazardous Air Pollutants permit would be required from the North Coast Unified Air Quality Management District for the demolition of the Jacoby Creek bridge.
- An on-site hazardous waste/toxic materials spill prevention and accidental spill response plan would be required prior to construction.
- The development of the final project plans, specifications, and estimates would direct the construction contractor's attention to the presence of asbestos in the southbound Jacoby Creek bridge, and to have a plan for its abatement.
- Best Management Practices to avoid and minimize adverse water quality effects during and after construction would be implemented—see Chapter 3, Section 3.2.2 for more information.
- Travelers, residences, and businesses would be notified in advance of construction activities.
- In order for businesses to anticipate, plan, and make any adjustments to the access restrictions, Caltrans would provide advance notification of project progress.
- Because of the potential for disproportionate adverse effects on the Redwood Coast Cabins and RV Resort and Lazy J Trailer Ranch residents, Caltrans would periodically inform residents of the project design and planning process and provide opportunities for additional comment.

- During construction, two lanes of traffic in both directions on Route 101 would be maintained during peak traffic periods. Caltrans would notify emergency service providers in advance of the proposed construction schedule, temporary access restrictions, and possible detour routes prior to making any access modifications. With such advance notifications, impacts on service providers during construction would not be substantial.

- Caltrans is working with emergency response agencies to identify appropriate median openings along the Route 101 corridor that would only be used by emergency vehicles. With emergency access openings in place after construction, impacts on service providers would not be substantial.

- The new bridge would be erected to the east of the existing southbound Jacoby Creek bridge. The southbound Jacoby Creek bridge replacement would require both lanes open during peak travel periods (basically daylight hours); therefore, the bridge would need to be replaced in a manner where two lanes could be made available every day. The method proposed for the bridge replacement would involve constructing the new two lane bridge temporarily next to the existing bridge, realign traffic to the new bridge, remove the old bridge, then choose one evening to close the southbound lanes altogether to move the new bridge to the original alignment and finally relocate traffic back to its original alignment.

- A comprehensive Transportation Management Plan (TMP) would be prepared prior to construction to maintain circulation on streets and arterials for the duration of the three year construction period. Caltrans staff would coordinate preparation of the TMP with the California Highway Patrol, emergency services, and public agencies such as the County of Humboldt. The TMP also considers community and special events and holidays. The TMP would be implemented during construction and would minimize disruption to travelers, business owners, customers and residents. The TMP would require, but not be limited to, standard measures such as:

    - Limiting long-term lane closures. During peak travel periods, two lanes of traffic in each direction on Route 101 would be maintained. If lane and ramp closures were necessary, they would be limited to night and off-peak hours;
    - Placing work hour restrictions on both the Route 101 mainline and business accesses;
    - Local streets and private driveways would be kept open during the construction of any one of the Build Alternatives;
    - Advanced changeable message signs and broadcast media notifications, detour plans, and other contingency plans;
    - Prohibiting any road work on holidays (such as the 4th of July or Labor Day weekend) or when special events are scheduled;

  - Caltrans would provide advance notification of planned highway detours and road closures to local cities and the County of Humboldt;
  - Caltrans would inform businesses and the media in advance of any project work that might affect business;
  - Bicycle access would be maintained through the project construction zone. Detours for bicycles would not be expected. Project construction contract special provisions would require the construction contractor to be responsible to maintain a clean shoulder that is safely passable by bicyclists;
  - The existing posted speed limits on Route 101 between Eureka and Arcata would remain the same during construction to avoid excessive traffic delays and traffic diversion to State Route 255 or Old Arcata Road.

- Low-growing California native grass species in obliterated median areas and to all soils disturbed by construction would be provided.
- Barrier railing for all bridges, retaining wall (Alt. 1A), and the overcrossing at the interchange would be consistent in type and color.
- Billboards on bay side would be removed as much as possible.
- At the Intersection of Route 101 and Airport Road, shrubs would be planted on the east side of the highway.
- At the Indianola Interchange, native coastal trees and shrubs would be planted at a ratio of 2:1 (planted:removed) at the on- and off-ramps on the east side of Route 101. Low-growing native shrubs would be planted on slopes at the on- and off-ramps on the west side of Route 101. Native shrubs and low growing trees would be planted on slopes of the overcrossing.
- From Indianola Cutoff to Bracut, new fill slopes for the deceleration lane at Resale Lumber Products, PMs 83.2 to 83.35, would be planted with native trees from 5-15 gallon containers and shrubs from 1 gallon, or similar, containers.
- From Bracut to Bayside Cutoff, removed trees would be replaced with native Bishop Pine (*Pinus muricata*) in 5-15 gallon containers.
- At the Jacoby Creek and Gannon Slough bridges (northbound), removal of trees required for bridge construction would be replaced with Bishop Pine *(Pinus muricata*) in 5-15 gallon containers.
- At Jacoby Creek bridge (southbound), the bridge deck west of the edge of the traveled way would be darkened by staining or integral colorant in the concrete. This includes the shoulder and pedestrian path.

- The portion of the archaeological site located near, but outside of the Caltrans right-of-way, would be identified as an Environmentally Sensitive Area on final project construction plans. High visibility mesh fencing would be placed along the border of the site at the Caltrans right-of-way prior to construction activities, and construction personnel would be directed to keep all equipment and activities outside of the fenced area.
- Although no intact archaeological sites are known to occur entirely within the project Archaeological APE, the Table Bluff Wiyot Tribe deems portions of the project sensitive for potential cultural resources. (See Chapter 5 for more information on Tribal Coordination.) Through consultation between Caltrans and the Table Bluff Wiyot Tribe, it has been agreed to monitor these locations in the event that items of significance to the Tribe are unearthed during earthmoving activities. If cultural materials were discovered during construction, all earth-moving activity within and around the immediate discovery area would be diverted until a qualified archaeologist could assess the nature and significance of the find.
- If human remains were discovered, State Health and Safety Code Section 7050.5 states that further disturbances and activities shall cease in any area or nearby area suspected to overlie remains, and the County Coroner contacted. Pursuant to Public Resources Code Section 5097.98, if the remains were thought to be Native American, the coroner would notify the Native American Heritage Commission (NAHC) who would then notify the Most Likely Descendent (MLD). At that time, the person who discovered the remains would contact the Caltrans Archaeologist who may work with the MLD on the respectful treatment and disposition of the remains.
- A project specific Storm Water Pollution Prevention Plan (SWPPP) with Water Pollution Control Drawings showing locations and scheduling of Best Management Practice (BMP) installations, prepared by the construction contractor and approved by the Caltrans Resident Engineer, would be available for review.
- Biofiltration strips and swales would be installed to the maximum extent practicable in accordance to Caltrans SWMP design criteria. The area climate, soils, and slopes provide near-ideal conditions for dense vegetation growth biofiltration treatment (a type of permanent BMP). In addition, selected temporary construction BMPs would remain in place for additional soil stabilization and sediment control measures.
- Implementation of the following permanent BMPs applicable to this project would be designed to minimize impacts to water quality from stormwater runoff:
    - Cut and fill slopes would receive a hydroseed application formulated by a licensed Landscape Architect to provide final stabilization.
    - Use of asphalt dikes and overside drains would be kept to a minimum to maintain stormwater sheet flow drainage patterns.

  - Drainage conveyance systems would be designed with consideration of downstream effects.
  - A retaining wall structure would be used to minimize impacts to adjacent wetlands and existing drainage patterns at Jacobs Avenue (Modified Alternative 3A) or at the Route 101 Slough north of the California Redwood Company on the east side of Route 101 (Alternative 1A).
  - Sheet flow stormwater runoff drainage patterns over vegetated fill slopes and swales would be maximized for biofiltration treatment.
  - Native or site-appropriate vegetation would be planted.

- Caltrans has committed to collect representative paleontological samples from some drilling cores as described in Section 3.2.4.
- Aerially Deposited Lead standard measures would be followed within current Aerially Deposited Lead Agreement with the Department of Toxic Substances Control.
- Resident Engineer would direct the construction contractor's attention to the presence of asbestos in the southbound Jacoby Creek bridge, and require an abatement plan. A National Emission Standards for Hazardous Air Pollutants permit would be required from the North Coast Unified Air Quality Management District for the demolition of this bridge.
- The project would include implementation of stormwater quality BMP NS-2 that pertains to dewatering operations. In addition, a dewatering plan would be submitted as part of the SWPPP/WPCP detailing the location of dewatering activities, equipment, and discharge point.
- Impacts from dust generation by excavation and construction activities would be localized and of a temporary nature. Dust control practices, as described in NCUAQMD Rule 1-4-430 and below, would be employed to minimize or avoid potential exceedances (violations) of the PM_{10} air quality standard during construction.
- The handling, transporting, or open storage of materials in such a manner which would allow or may allow unnecessary amounts of particulate matter to become airborne would not be permitted.
- Reasonable precautions would be taken to prevent particulate matter from becoming airborne including, but not limited to, the following provisions:
  - Covering open bodied trucks when used for transporting materials likely to give rise to airborne dust.
  - Installation and use of hoods, fans, and fabric filters to enclose and vent the handling of dusty materials. Containment methods would be employed during sandblasting and other similar operations.

  - The use of water or chemicals for control of dust in the demolition of existing buildings or structures, construction operations, the grading of roads or the clearing of land.
  - The application of asphalt, oil, water or suitable chemicals on dirt roads, materials stockpiles, and other surfaces which could give rise to airborne dusts.
  - The paving of roadways and their maintenance in a clean condition.
  - The prompt removal of earth or other material from paved streets onto which earth or other material has been transported by trucking or earth moving equipment, erosion by water, or other means.
- In addition, employing the following measures to minimize pollutant emissions from construction equipment exhaust would be employed as appropriate and reasonable:
  - Keeping engines properly tuned;
  - Limiting idling;
  - Avoiding unnecessary concurrent use of equipment.
- If emission levels are exceeded during construction, consider using Enhanced Fugitive PM Dust Control Practices as an option to reduce pollutant emissions.

Biological Resources

- ***Construction Worker Education.*** The pre-job meeting with construction workers would consist of a briefing on environmental issues relative to the proposed project. Information would be provided by a qualified biologist.
- ***Erosion Control.*** Temporary erosion control measures would be implemented on all disturbed areas. Permanent erosion control measures would be implemented upon completion of construction. All disturbed areas would be revegetated with native, non-invasive plant species or non-persistent plant hybrids that would serve to stabilize site conditions and prevent invasive plant species from colonizing. See Chapter 3, Section 3.2.2 for more information regarding erosion control.
- ***Environmentally Sensitive Areas.*** Caltrans would establish and indicate Environmentally Sensitive Areas (ESAs) on project plans and specifications to avoid potential construction impacts to sensitive biological resources (rare plant populations) located within and adjacent to the construction corridor. Temporary exclusionary fencing would be placed around populations of special status plant species prohibiting construction activities in those areas.
- ***Construction Monitoring.*** Caltrans would have a qualified biologist as needed to monitor construction activities in sensitive biological resource areas (see the NES for a description of these areas) to monitor for resource agency permit compliance and compliance to avoidance and minimization requirements.

- ***Compliance with Migratory Bird Treaty Act.*** To minimize impacts to cliff and barn swallows in compliance with the Migratory Bird Treaty Act, measures such as exclusionary netting or nest removal every 2-3 days would be implemented during the breeding season (March 1 – September 1). It is likely that other species of migratory birds may be nesting in the BSA. To avoid adverse effects to these birds, the removal of any suitable nesting habitat (grasses, shrubs and trees) would take place between September 1st and March 1st, outside the nesting season or following field survey work by a qualified biologist with non-nesting documentation.
- Coordination with CDFW (2007) has identified measures to reduce impacts to Lyngbye's sedge at the Jacoby Creek bridge replacement. These minimization measures would include the placement of protective 1/2 to 2-inches thick metal/wood/rubber sheets on top of the stands of Lyngbye's sedge where equipment access would be required. These pads would be large enough to prevent the equipment tracks/wheels from rutting and compressing the soil and uprooting or destroying the sedges. The disturbed sedge would be expected to fully recover within a few seasons.

Seasonal Restrictions

- In-stream work within a bed, bank, or channel of a watercourse would be restricted to the period between July 1st and October 15th.
    - Construction activities restricted to this period would include all tide gate replacements, rock weir construction at Gannon Slough, pile installation on the banks of Jacoby Creek for the new bridge and the detour bridge, and activities associated with workers potentially walking in Jacoby Creek to install/maintain the debris containment structure and remove the old bridge piers.
- Any work performed within a wetted channel that would involve placement of rock or workers walking within the channel (i.e., construction of rock weir at Gannon Slough, possible tide gate replacement, and construction/maintenance of containment systems for bridge demolition and bridge pier removal) would coincide with low flow and low tide events (outside of significant precipitation events and between the latter two hours of outgoing tides and beginning two hours of incoming tides).
- In-stream work would be limited to low flow and low tide periods to minimize potential turbidity associated with workers walking in the channel or rock placement, and minimize exposure and avoid injury to fish that might otherwise be present when water levels are higher.

Tide Gates

Caltrans would contract a qualified consultant to conduct a hydraulic analysis of the slough channels for the Old Jacoby Creek, Brainard, and Gannon Sloughs, where fish-friendly tide gates would be installed prior to construction to establish existing hydraulic conditions. All the new fish-friendly tides gates would be monitored by a qualified consultant for two years after installation. Monitoring would include flow levels and salinity to ensure the existing hydrological conditions are maintained or improved within the affected channels. For the first two years, Caltrans maintenance would coordinate with the consultant to ensure appropriate operation and maintenance of the tide gates.

Bridge Work

- To avoid barotrauma to fish, no piles would be installed in the active, wetted channel for the new southbound Jacoby Creek bridge. Piles would be vibrated, oscillated, or rotated into place on the bank 15 to 20 feet from the wetted channel. Impact driving would not be used.
- Piers from the old southbound Jacoby Creek bridge would be cut above the low tide water level to avoid impacts to fish and fish habitat. The bridge piers would be removed without excavation or the use of isolation casing to minimize turbidity in the creek.
- To avoid and minimize impacts to the watercourses, all bridge debris would be contained. The demolition debris containment system may be mounted on the existing bridge piers and/or placed on the stream banks outside of the wetted channel. Containment would minimize the potential for bridge demolition debris to enter the watercourse.
- No construction equipment would work within the active, wetted creek channel; however, workers would need to walk within the stream to install, maintain, and remove the debris containment system. The contractor would be required to submit a demolition plan to the Resident Engineer for approval. The demolition plan would describe measures taken to restrict or minimize construction debris from entering the creek channel and to avoid or minimize the amount and extent of workers walking in the stream channel. The demolition plan would prohibit the use of any structure placed within the wetted channel of Jacoby Creek and require demolition activities coincide with low flow periods to minimize watercourse impacts.
- The contractor would be required to place temporary barrier fencing, or a similar form of visual barrier, along the entire length of the north and south banks of Jacoby Creek (within the vicinity of the SB and NB Jacoby Creek bridges) to minimize visual disturbance to fish and to prevent workers from crossing the creek during routine movements within the BSA. In addition, the contractor would build or install a temporary footbridge that workers could use to cross the creek without walking in the wetted channel. Both ends of the footbridge would be placed outside the wetted channel.

- Excavations for the temporary detour bridge abutments would be above the mean high tide line, avoiding the water of the active, wetted Jacoby Creek channel.
- To ensure adherence to all permit conditions and compliance to all minimization and avoidance measures, a qualified biologist would be present to monitor all in-stream activities associated with removal of the old southbound Jacoby Creek bridge and piers. The biologist monitor would also ensure the temporary footbridge and the visual barrier would be properly installed and maintained.

Installation of Tide Gates

The following conservation measures were developed in consultation with USFWS and CDFW to minimize impacts to the federally listed tidewater goby and are appropriate for the protection of the listed salmonids addressed in the Caltrans 2016 BA.

- Tide gates would be installed during low tide (i.e., when old tide gates are out of the water) to minimize sediment release into waterways and to avoid fish that may occur at the tide gate sites when water is present.
- Before construction, a qualified consultant (approved by the USFWS and NOAA FISHERIES) would assess pre-project hydrologic conditions upstream of the existing tide gates.
- The biological consultant would make the preliminary settings to the adjustable fish-friendly tide gates. Since the gates are being replaced because they no longer close effectively, the new adjustable gates would be opened enough to mimic the current hydrology. Once the tide gates are installed, upstream water conditions would be monitored daily and the adjustable gate opened or closed slightly until average weekly post-construction conditions are within 95 percent of pre-construction conditions.
- Monitoring and adjustment by a qualified consultant would continue for two years following tide gate installation. There would be no monitoring of water conditions at new tide gates that are not adjustable (i.e., tide gates at Jacobs Avenue and California Redwood Company ditches).

Best Management Practices Measures

Best Management Practices (BMPs) would be used to avoid and minimize impacts to water quality, aquatic habitat, and listed fish. These measures would conform to the provisions in sections 20-2 and 20-3 of the Caltrans Standard Specifications and the special provisions included in the contract for the proposed action. Such provisions would include the preparation of a Storm Water Pollution Prevention Plan (SWPPP) and Water Pollution Control Plan (WPCP) prior to construction, which describe construction activities and illustrate the best BMPs for the proposed action. BMPs for the proposed action would include, but are not limited to, the following:

- Scheduling: construction activities involving soil disturbance would take place during dry weather conditions, generally between June 1 and October 15, to minimize sediment discharges to receiving waters. Furthermore, the SWPPP (prepared by the contractor prior to construction) would include a scheduling BMP that specifies: 1) the project schedule would sequence construction activities with the installation of both soil stabilization and sediment control measures; 2) BMPs would be deployed in a sequence to follow the progress of grading and construction; 3) the construction schedule would be arranged so that grading and construction would occur during the dry summer months; and 4) proper scheduling would be done to avoid grading, landscaping application, pavement striping, concrete work, and asphalt paving from occurring immediately prior to forecast rain events.
- Preparation of Rain Event Action Plans (REAP) 48-hours prior to any forecasted precipitation to ensure adequate stabilization of equipment, materials, and soils would be completed.
- Any debris and sediment would be contained within the work site or diverted into a sedimentation basin before being returned to any receiving waters. Excess material excavated from the work site would be disposed off-site at an approved disposal site away from any stream course.
- Soil stabilization measures (mulching, straw wattles) would be implemented during and after construction to reduce sediment discharge from areas of disturbed soil. After construction, areas of bare soil would be seeded or planted with a non-persistent cereal grain and California native seed mix. Straw would be certified weed-free. These measures would provide immediate soil stabilization and subsequent vegetative cover until natural processes resume (i.e., next growing season).
- When construction is complete, watercourse banks would be returned to natural contours. The upper six inches of excavated material would be conserved and then replaced, and, if necessary, seeded and planted with native, regionally appropriate species. Revegetated areas would be monitored for up to four years or until 80 percent success rate is achieved.
- Silt fences, straw bales, and/or fiber rolls would be placed to control sediment discharge; minimal sediment would be released into receiving waters. Certified weed-free mulch, silt fences, straw bales, and/or fiber rolls would be applied to exposed soil areas for over-wintering protection from erosion.
- Measures would be taken to prevent construction equipment discharges from contaminating soil or waters in the construction site. Construction site entrances/exits would be stabilized and street sweeping performed to prevent tracking of sediment.
- Perimeter control for the temporary stockpiling of materials, soil, and debris that may contain potential contaminants (e.g., concrete debris, treated timbers). Excavated spoils would be controlled to prevent sedimentation to the stream.

- Use of geo-synthetic fabric (e.g., plastic, filter fabric) barriers to prevent the discharge of pollutants (e.g., sediment, oil and grease, etc.) when equipment is working adjacent to or over waterways.
- A temporary concrete washout facility would be placed on-site for concrete clean up. No concrete washings or water from concrete would be allowed to flow into waterways. No concrete would be poured within the waterways. Water that has come into contact with setting concrete would be pumped into a tank and disposed of at an approved disposal site.
- To control fugitive dust during construction, loose debris would be cleaned up using a vacuum truck (as opposed to a kick broom machine). Also, pavement would be removed by cold planing, using a machine that deposits grindings directly into a truck. The cutting teeth of the grinder are lubricated with water, which is enough to minimize dust production, but not enough to create runoff.
- Preparation and implementation of a sampling and analysis plan for discharges during construction.
- Instead of conventional hydraulic fluids, non-toxic, biodegradable vegetable oil would be used for operating the hydraulic equipment (i.e., vibratory hammer) needed to install the bridge piles at Jacoby Creek. Vegetable oil would also be used in other hydraulic equipment working over or adjacent (within 50 feet) to project watercourses as feasible.
- Only untreated wood timbers would be used for construction within 50 feet of OHWL.

Staging Areas

- Primary staging areas would be on Route 101 shoulders with possible additional staging areas on nearby private property. No staging area would occur within environmentally sensitive areas.
- Any vehicles stored within 150 feet of the OHWL of drainage facilities, watercourses, sloughs, or Humboldt Bay would have spill prevention measures in place for refueling. This includes placement of an absorbent boom around the fuel port (on machine being fueled), as well as a thick absorbent mat that is rolled out on the ground under the equipment to catch a larger spill. When fueling vehicles and other equipment, there would be a person located at both the fuel nozzle and the truck valve so that emergency shut-off could be made if there was a nozzle or hose failure.
- Proper and timely maintenance of vehicles and equipment used during construction to reduce the potential for mechanical breakdowns leading to a spill of materials.

- All equipment remaining on the job site would have secondary containment placed beneath the drip zone when left overnight. Leaks would be immediately controlled with absorbent mats and repaired before equipment operates again. Clean up of petro-chemical drips would occur as soon as they were observed. All equipment would be monitored by the contractor daily for chemical leakage. To offer protection from storm events, Caltrans would require monitoring for storm events and the movement of equipment accordingly.
- For all night road work and paving operations that require the use of artificial light, light shields would be used to direct lighting toward the roadway and away from adjacent water bodies to avoid impacting the aquatic environment.

Conservation of Riparian Habitat

The following measures would be implemented to reduce potential impacts to riparian habitat in the BSA:

- The width of the construction disturbance zone within riparian areas would be minimized through careful pre-construction planning.
- Exclusionary fencing would be installed along the boundaries of all riparian areas and other environmentally sensitive areas (i.e., wetlands) to avoid impacts to these habitats outside the project footprint.
- Riparian vegetation removal (e.g., tree trimming) would be restricted to the minimum needed for construction access.
- Once the bridge detour is removed, the median at Jacoby Creek would be replanted with native trees and shrubs and seeded with native herbaceous vegetation aptly suited to the project region.

All disturbed areas would be revegetated and restored to pre-construction conditions. Replanting would occur with native plant material indigenous to the area.

To minimize underwater noise impacts (barotrauma) to fish, only land-based vibratory, rotating, or oscillating pile driving would be used for the southbound Jacoby Creek bridge replacement. To reduce sedimentation, erosion control measures would be used on areas of exposed soil during and after construction. Details of minimization and avoidance measures have been determined with input from the USFWS, and are included as conditions in the Biological Opinion they issued. Additional conditions would be included in permits issued by regulatory agencies (USACE, CDFW, and RWQCB).

Construction best management practices (BMPs) would be implemented to minimize impacts to water quality and special status fish by minimizing or avoiding siltation and erosion of exposed soils. These practices would consist of application of permanent and temporary construction treatments for controlling stormwater runoff and preventing discharges of excessively turbid water from the job site.

The applicable BMPs include the following:

- No concrete washings or water from concrete would be allowed to flow into the streams. No concrete would be poured within flowing water in the streams.
- Construction disturbance would be restricted to the minimum necessary for completion of the project.
- Staging areas, storage areas and equipment parking would not occur within any watercourse bed, bank and channel.
- Measures would be taken to ensure no discharges from equipment operating in the ditches would get into the watercourse. Leaky equipment may be placed on pads underlain with plastic sheeting (Visqueen) that would absorb any fueling spillage or be a barrier for any spillage.
- Silt fences would be placed within the limits of construction in order to eliminate potential impacts to fisheries and other aquatic resources that potentially occur within these sensitive areas.
- Construction within this area would likely be scheduled during the dry season, typically between June 15 and October 15, to minimize the potential for erosion and sediment impacts. Bridge construction work may be year round.

Fish-friendly tide gates would be installed to improve habitat for salmonids and tidewater goby. Also, to enhance fish habitat, a rock weir would be installed downstream of the tide gates at Gannon Slough and twelve 18-inch diameter concrete piles would be removed from the estuarine waters of Jacoby Creek for the bridge replacement.

Replacement of some of the existing tide gates with fish-friendly tide gates is an additional measure Caltrans is employing to minimize effects to listed fish species. Tide gates would be replaced at low tide so that there would be negligible effects to fish and water quality.

General avoidance and minimization measures as stated in the Biological Opinion from the USFWS and the Letter of Concurrence from NOAA Fisheries would be implemented as part of construction activities to minimize and avoid impacts to sensitive as well as common biological resources.

To reduce the spread of invasive non-native plant species, Caltrans may implement the protection measures in compliance with Executive Order (EO) 13112, to the greatest degree possible, as described below. The following avoidance and minimization measures would be implemented:

- All equipment used for off-road construction activities would be weed-free prior to entering the project.

- Any seed mixes, or other vegetative material used for revegetation of disturbed sites, would consist of non-persistent cereal grain, California native seed mix or locally adapted native plant materials to the extent practicable.
- Any equipment (including boots/waders) and construction equipment would be properly disinfected or cleaned according to guidance provided by the State of California Aquatic Invasive Species Management Plan (CDFG 2008; U.S. Bureau of Reclamation 2012) prior to in-water work to prevent the spread of aquatic invasive species.
- Excess excavated soil and plant materials would be disposed of at an upland location where it would not wash into any watercourse. The disposal would be in compliance with all county and local regulations.
- Caltrans would not allow disposal of soil and plant materials from any areas that support invasive species to areas that support stands dominated by native vegetation.
- Plant species used for erosion control would consist of native, non-invasive species or non-persistent hybrids that would prevent invasive species from colonizing.
- Gravel and/or fill material to be placed in relatively weed-free areas would come from weed-free sources.
- Resident Engineers would be educated on weed identification and the importance of controlling and preventing the spread of identified invasive non-native species.
- The Project Revegetation Plan would address and implement an invasive weed plan which would target identified invasive species on the California Department of Food and Agriculture or the Cal-IPC list. Herbicides would not be used since Caltrans does not use herbicides in most of Humboldt County.

Other measures for adverse project effects could be imposed during the resource agency permitting process after the Environmental Impact Report/Statement is approved.

Chapter 7 List Of Preparers

The following Caltrans personnel prepared this document:

Janice Calpo, Caltrans Headquarters Staff Architectural Historian, MS Historic Preservation, University of Oregon, Eugene. Eleven years of experience in the field of Cultural Resources Management, including cultural resource surveys for Section 106 and CEQA compliance. Assisted in both the archival research and field inventory for the project.

Kimberly Floyd, Senior Transportation Engineer, BS Civil Engineering, UC Davis., Fifteen years of engineering experience. Project Manager.

Kelley Garrett, Associate Environmental Planner, BS Natural Resources Planning, Humboldt State University, Arcata. Seven years of experience as a project biologist. Prepared Conceptual Mitigation Plan.

Mitchell Higa, Associate Environmental Planner, BA Environmental Studies and Planning, Sonoma State University. Over 20 years of environmental planning experience. Prepared Environmental Impact Report/Statement and coordinated environmental studies for the project.

Timothy Keefe, Associate Environmental Planner–Archaeology. BA Anthropology, University of Massachusetts at Amherst, 1990. Eight years of experience as an archaeologist for the State of California. Ten years previous archaeological experience includes National Park Service at Yosemite National Park and Stanislaus National Forest, fieldwork in Michoacan and Zacatecas, Mexico, archaeological field projects in New Mexico and Massachusetts. Prepared supplemental Archaeological Survey Report.

Todd Lark, Transportation Engineer, BS Civil Engineering, California Polytechnic University, San Luis Obispo 1989. Eleven years design experience for private consulting engineering firm, fourteen years highway design and project development experience Caltrans. Prepared Project Report.

Laura Lazzarotto, Landscape Architect License #4045. BA Landscape Architecture, University of California, Berkeley; Seventeen years of experience in Landscape Architecture. Prepared Visual Impact Analysis report for Roadway Rehabilitation Project.

Dawn McGuire, Engineering Geologist–Ph.D., Geology and Geochemistry, Colorado School of Mines, Stratigraphy and Paleontology. B.A. and M.A., Geological Sciences, UC Santa Barbara. California Licenses: Professional Geologist #7181, Certified Engineering Geologist #2280, Certified Hydrogeologist #905. Forty years of experience in geoscience with U.S. Geological Survey (Research Geologist), California Geological Survey, Shasta Community College (adjunct professor), and Caltrans. Research resulted in more than 70 publications in geology, stratigraphy, paleontology, radiometric age dating, and geochemistry. Prepared the Paleontological Resources Report.

Jason Meyer, Associate Environmental Planner– Generalist, BS Wildlife Management, Purdue University, 1996. MS Wildlife Management, Humboldt State University, 2005. Fourteen years of research and field experience with birds, mammals, plants, and wildlife ecology. Nine years or experience in environmental planning. Prepared Final Environmental Impact Report/Statement.

Gail G. Popham, Associate Environmental Planner–Natural Science, BS Fisheries Science, Oregon State University, 1996. BS Wildlife Science, Oregon State University, 1996. MS Natural Resources, Humboldt State University, 2000. Ten years of research experience with plant, fish, and wildlife ecology. Ten years of experience in Environmental Planning. Prepared Natural Environment Study.

Sharon Tang, Transportation Engineer Technician (Air/Noise); AA Business/Engineering, Sacramento City College. Five years of experience. Prepared Air Quality Analysis.

Ted Schultz, P.E., Transportation Engineer. BS Civil Engineering. Thirty years of transportation and facility engineering experience. Prepared Water Quality Study Supplemental Report.

Judy Tordoff, Associate Environmental Planner - Archaeology. MA and Ph.D., Anthropology (Human Osteology and Historical Archaeology, respectively), Michigan State University. 39 years archaeological experience, 25 of them in California. Caltrans PQS - Principal Investigator, Historical Archaeology. Prepared Archaeological Survey Report.

Kimberly Wooten, Associate Environmental Planner, Archaeology. BA Anthropology, University of California, Santa Barbara, and has worked as an archaeologist since 1988 on both prehistoric and historical sites in California; prehistoric sites in British Columbia; and classical period sites in Greece. Ms. Wooten qualifies as a PQS Co-principal Investigator in historical archaeology. Co-authored the supplemental HRER.

Benjamin Tam, Transportation Engineer, BS Civil Engineering, San Jose State University, San Jose, CA. Sixteen years of Caltrans experience, 9 years as noise specialist. Oversight of noise and energy studies.

Steve Werner, Associate Engineering Geologist. MS Geology, San Diego State University. Registered geologist with fifteen years of experience in Hazardous Waste Management. Prepared Hazardous Waste Study.

Other Caltrans project development personnel who contributed to the EIR/S preparation:

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Lena Ashley, Senior Transportation Engineer
Larry Bowermaster, Senior Transportation Engineer, Construction
Marie Brady, Transportation Engineer
John Carson, Senior Transportation Engineer
Steve Croteau, Senior Environmental Planner
Barry Douglas, Associate Environmental Planner – Archaeology
Stephanie Frederickson, Associate Environmental Planner, Natural Sciences
Deborah Harmon, Senior Environmental Planner
Charlie Hayler, Transportation Engineer
Jim Hibbert, Landscape Architect
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Rosalind Litzky, Senior Environmental Planner
Ralph Martinelli, Senior Transportation Engineer
Richard Mullen, District 1 - Traffic Operations/Project Manager
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Dave McCanless, Senior Right-of-Way Agent
David Melendrez, Senior Transportation Engineer, Water Quality
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The following consultants prepared specialized studies for this environmental document:

URS Corporation

Armando Cuellar. MA Anthropology, Hayward State University. Five years of experience in cultural resources management. Prepared Cultural Resources reports.

Sean Dexter. BA Anthropology, University of Nevada, Reno. Nine years of experience in cultural resources management. Prepared Cultural Resources reports.

Suzanne Eastridge. BS Environmental Sciences, University of California, Santa Cruz. Five years of experience as an environmental planner. Assistant Project Manager for Environmental Studies.

David Fee. MA Anthropology, University of Arizona. Twenty-one years of technical and project management experience. Project Manager for Environmental Studies.

Brian Graham. BA Geology, University of Colorado. Five years of project experience related to hazardous materials. Prepared Phase 1 Environmental Site Assessment report.

Rosemary Laird. MS Marine Science, College of William and Mary. Six years of experience in preparing biological resources studies. Prepared Natural Environment Study report.

Stephen Leach. MA Plant Ecology, University of California, Davis. Ten years of experience preparing biological resources studies. Prepared Natural Environment Study report.

Corrina Lu. MA Geography, University of California, Los Angeles. Five years of experience in preparing biological resources studies. Prepared Natural Environment Study report.

Joe Morgan. BS Chemistry, Georgia Institute of Technology. Eighteen years of project experience related to hazardous materials. Prepared Phase 1 Environmental Site Assessment report.

Sally Morgan. MA Anthropology, San Francisco State University. Twenty-two years of experience in cultural resources management. Prepared Cultural Resources reports.

Geoff Thornton. BS Biochemistry, University of California, San Diego. Three years of experience as an environmental scientist and environmental planner. Prepared Air Quality and Energy reports.

Cheri Velzy. BS Meteorology, California State University, San Jose. Eight years of experience as an air quality specialist. Prepared Air Quality report.

Jeff Zimmerman. BS Conservation of Natural Resources, University of California, Berkeley. Twenty years of experience in environmental planning and project management. Peer Reviewer.

Illingworth & Rodkin, Incorporated

Richard Illingworth. BS Civil Engineering, University of California, Davis; Thirty-fouor years of experience as a noise specialist. Prepared Noise Impact Study report.

James Reyff. BS Geosciences, San Francisco State University. Twelve years of experience as a noise specialist. Prepared Noise Impact Study report.

Michael Thill. BS Environmental Studies, University of California, Santa Barbara. Four years of experience as a noise specialist. Prepared Noise Impact Study report.

JRP Historical Consulting Services

Brian Hatoff. Registered Professional Archaeologist; BA, MA Anthropology, University of California, Davis. Thirty-one years of experience in cultural resources management. Prepared Cultural Resources reports.

Amanda Blosser. MS History, Texas Tech University. Three years of experience as an architectural historian. Prepared Historical Resources Evaluation Report.

Courtney Chambers. MA Candidate Public History, California State University, Sacramento. Two years of experience as an architectural historian. Prepared Historical Resources Evaluation Report.

Rand Herbert. MAT History, University of California, Davis. Twenty-seven years of experience as an architectural historian. Prepared Historical Resources Evaluation Report.

Mara Feeney & Associates

Mara Feeney. MA Community and Regional Planning, University of British Columbia. Twenty-three years of experience as a community and regional planner. Prepared Community Impact Assessment.

William Paul. PhD Environmental Planning and Design, Virginia Tech. Seven years of experience as a land use planner and community involvement specialist. Prepared Community Impact Assessment.

Vallier Design Associates

Matt Brockway. Bachelor of Science / Landscape Architecture, 1986, Colorado State University, Fort Collins, CO. Seventeen years of professional experience in the production of visual simulations and visual impact assessments. Prepared Visual Impact Assessment.

WRECO

John Mountain. MS Civil Engineering, California State University, Long Beach. Twenty-two years of experience as a civil engineer specializing in water resources and transportation projects. Prepared Water Quality Study Report.

Chapter 8 Distribution List

In compliance with NEPA and CEQA, public agencies have been notified of the availability of the Draft EIR/S. The Draft EIR/S availability has been published in the Federal Register and in local newspapers. The notifications of availability have been sent to all parties on the project mailing list.

The Draft EIR/S has been distributed to key interested parties and key elected and appointed officials. The Draft EIR/S is available at the following locations:

Arcata Public Library, 500 7th Street, Arcata

Eureka Public Library, 1313 3rd Street, Eureka

Caltrans District 1 Office, 1656 Union Street, Eureka
Please call Sandra Rosas at (707) 441-5730 in advance.

The Final EIR/S was sent to the following organizations:

Resources Agency
1416 Ninth St. Ste. 1311
Sacramento, CA 95814

Dept. of Conservation
801 K Street, 24th Floor
Sacramento, CA 95814

Department of Fish and Wildlife
60l Locust Street
Redding, CA 96001

California Coastal Commission
North Coast Office
1385 8th Street, Suite 130
Arcata, CA 95521

Regional Water
Quality Control Board
North Coast Region
5550 Skylane Blvd., Suite A
Santa Rosa, CA 95403

State Office of
Historic Preservation
P.O. Box 942896
Sacramento, CA 94296 – 0001

Native American
Heritage Commission
9l5 Capitol Mall, Room 364
Sacramento, CA 95814

California State Lands Commission
100 Howe Ave., Suite 100 South
Sacramento, CA 95825-8202

California Highway Patrol
Office of Special Projects
2555 1st Ave.
Sacramento, CA 94298

California Highway Patrol
255 East Samoa Blvd.
Arcata, CA 95521-6797

Air Resources Board
1001 I St
Sacramento, CA 95814-2814

Integrated Waste
Management Board
1001 I St
Sacramento, CA 95814

Dept. of Toxic
Substances Control
CEQA Tracking Center
400 P Street, Fourth Floor
P.O. Box 806 (1001 "I" St)
Sacramento, CA 95812-0806

North Coast Unified Air Quality
Management District
2300 Myrtle Avenue
Eureka, CA 95501

Natural Resources
Conservation Service
5630 S. Broadway
Eureka, CA 95503

Humboldt County
Planning Department
3033 H Street
Eureka, CA 95501

Hank Seemann
Environmental Services
Humboldt County
Public Works Department
1106 Second Street
Eureka, CA 95501

Humboldt County
Department of Public Works
Aviation Division
1106 2nd Street
Eureka, CA 95501

City of Eureka
Public Works and Building Dept.
531 K Street
Eureka, CA 95501

City of Arcata
736 F Street
Arcata, CA 95521

Humboldt Bay Harbor,
Recreation and Conservation District
601 Startare Drive
Eureka, CA 95501

Federal Agencies

U.S. Fish and Wildlife Service
1655 Heindon Rd.
Arcata, CA 95521

NOAA Fisheries Service
1655 Heindon Road
Arcata, CA 95521-4573

U.S. Army Corps of Engineers (USACE)
Eureka Field Office
601 Startare Dr., Slip #14
Eureka, CA 95501

U.S. Environmental
Protection Agency
75 Hawthorne Street
San Francisco, CA 94105-3901

U.S. Coast Guard
Eleventh Coast Guard District
Building #50-6, Coast Guard Island
Alameda, CA 94501

Interested parties

Table Bluff Reservation
of Wiyot Indians
P.O. Box 519
Loleta, CA 95551

Blue Lake Rancheria
P.O. Box 428
Blue Lake, CA 95525

Bear River Band of
Rohnerville Rancheria
P.O. Box 731
Loleta, CA 95551

101 Corridor Access Project Group
c/o Harper Ford Country
4800 Highway 101 North
Eureka, CA 95501
Attn.: Trevor Harper

Humboldt Transit Authority
133 V Street
Eureka, CA 95501

Eureka Heritage Society
P.O. Box 1354
Eureka, CA 95502

Humboldt County
Historical Society
703 Eighth Street
Eureka, CA 95501

Sierra Club
Redwood Chapter Sierra Club
P.O. Box 238
Arcata, CA 95521

Northcoast Environmental Center
P.O. Box 4259
Arcata, CA 95518

California Native Plant Society
P.O. Box 1067
Arcata, CA 95518

Audubon Society
Redwood Region
P.O. Box 1054
Eureka, CA 95502

Eureka Chamber of Commerce
2112 South Broadway
Eureka, CA 95501

Redwood Community Action Agency
Natural Resources Services
904 G Street
Eureka, CA 95501

Keep Eureka
Beautiful Committee
c/o Greater Eureka Chamber of Commerce
2112 Broadway
Eureka, CA 95501

Friends of Humboldt County
P.O. Box 738
Eureka, CA 95502-0738

Humboldt Bay Bicycle
Commuters Association

Mr. Chris Steinbacher, Vice President of
Real Estate
c/o CBS Outdoor LLC
1695 Eastshore Highway
Berkeley, CA 94710

NOTE: Notifications of Final EIR/S availability will be sent to all individuals and organizations that submitted written comments on the Draft EIR/S.

Chapter 9 References

This chapter first consists of references used to prepare the overall document followed by references used to prepare individual specialized studies that are summarized in this document.

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